amateur radio

VOL. 43, No. 7 JULY 1975

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COVER PHOTO

This is the SRI 150 ft. dish used by WA6LET during the February 1975 moonbounce tests on 144 and 432 MHz. See details in letter on page 25.

JOURNAL OF THE WIRELESS INSTITUTE OF AUSTRALIA

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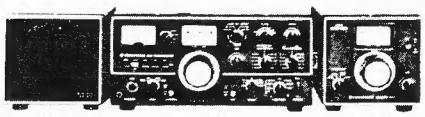
KENWOOD/TRIO TS 520 5 BAND SSB TRANSCEIVER



Specifications

Frequency Range: 80 metre band — 3.50 to 4.00 MHz; 40 metre band — 7.00 to 7.30 MHz; 20 metre band — 14.00 to 14.35 MHz; 15 metre band — 21.00 to 21.45 MHz; 10 metre band — 28.00 to 28.50 MHz, 28.50 to 29.10 MHz, 29.10 to 29.70 MHz; WWV — 10.00 MHz.

Mode (Receive only) USB, LSB, CW.
Input Power: 160 watts on 80 to 15 metre band, 140 watts on 10 metre band.
Nett amateur prices:

TS 520 $550.00 with PTT Mike

YAESU MUSEN FT101B

SSB/AM 240V AC & 12V DC operation,
160-10m transceiver **$585**

RINGO AR-2

135-175 MHz. Antenna has 3.75 dB gain **$27**

YAESU FT/FP200 TRANSCEIVER P.S.U. COMBINATION **$475**

MIDLAND 13-870D 5 WATT

AM, 23 channel, 11 metre transceivers, 12V DC operation **$99**

5 WATT

SSB/AM, 23 channel, 11 metre transceivers, 12V DC operation **$195**

144-148 MHz TWO METRE EQUIPMENT

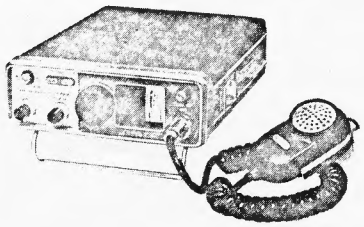
NOW WITH 6 CHANNELS

KEN KP-202, 2W, 144 MHz band. FM. Hand held transceiver with crystals for 6 channels, Ch. 40-50, R1, R2, R3, R4 **$149**

KCP-2 NICAD battery chargers & 10 Nicad batteries **$35**

Genuine leather carrying case for KP-202 **$5**

Ask for a package deal price



TRIO MOBILE TR7200C

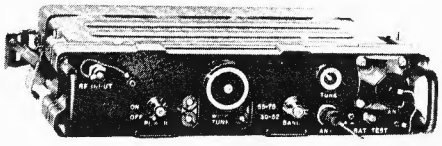
2 METRE FM TRANSCEIVER

22 Channels, fitted with Ch. 1 and 4 repeaters. Technical Data: Transmit 10 and 1 watt positions. Max. freq. deviation +15 kHz. Spurious response —60dB. Receiver less than 1W for 30 dB SW selectivity. 20 kHz at 60 dB down; 40 kHz at 70 dB down.

$235 — Extra Channel Crystals $10 Set

BARLOW WADLEY XCR30 Mk. II RECEIVER — LATEST MODEL

$259



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Originally used in conjunction with PRC10 which covers 30-75 MHz FM. Requires 1-4 watts drive and gives a nominal 25 watts out. Brand new in sealed box with complete service and user manuals.

$25 each

RF SIGNAL GENERATOR Model TE-20D

SPECIFICATIONS

Dial has 7 separate band TE-20D covers 120 kHz - 500 MHz.
(6 Fundamental Bands & 1 Harmonic Band)
Freq. Accuracy: +or—2%
Audio Output: to 8 volt
Internal Modulate: 400 Hz approx.
Tube: 12BH7A, 6AR5
Power Source: 105 - 125V, 220 - 240V AC 50/60 Hz, 12 watts.

TE-20D employs a xtal socket and can be used as below:

a.—Self-Calibration. b—Marker Generator
Small size — Space saving.
Printed Circuit for a uniform characteristics.
Dimensions: 140 x 215 x 170 mm. Weight: 2.8 kg.

Price $52.50. P&P $2.00

DELUXE Model TE-22D

AUDIO GENERATOR

SPECIFICATION

Freq. Range: Sin: 20Hz-[illegible]kHz
Square: 20Hz-25kHz
Output Voltage: Sine: 7 volt.
Square: 7 volt.
Output Impedance: 1000 ohm
Frq. Accuracy +3% + 2Hz
Distortion: Less than 2%
Tube Complement: 6BM8
12 AT7, 6Z4
Power Source: 105-125, 220-240V AC, 50/60 cps. 19W
With Attenuation Range
4 Ranges—1/1, 1/10, 1/100, 1/1K

$63.50

GRID DIP METER Model TE-15

SPECIFICATION

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B Coil 1.3—4.3MHz
C Coil 4.14MHz
D Coil 14.40MHz
F Coil 120-280MHz
Transistor: 3 TRs & 1 Diode
Meter: 500uA Fs.
Battery: 9V (BL-006P)
Dimensions: 180x80x40 mm
Weight: 730g

Price $36.50
P&P $1.00

amateur radio

JOURNAL OF THE WIRELESS INSTITUTE OF AUSTRALIA. FOUNDED 1910

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QSP IARU

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The IARU Calendar (No. 89) of Dec. '74 stated that concern has been expressed in some circles that the radio amateurs of the world, particularly in countries where there are no IARU Societies, do not fully appreciate the importance of the forthcoming World Administrative Radio Conference (WARC Geneva 1979) and that a way must be found to inform the world's amateurs that it may have the most serious consequences for the amateur radio service if we are not adequately prepared for it. It has been suggested that a message from the President of the IARU should be printed in many languages and distributed through QSL Bureaux.

The following is the message —

"The World Administrative Radio Conference to be held in Geneva in 1979 will decide the use to be made of all radio frequencies throughout the world in the following years. This includes frequencies now allocated to the amateur radio service.

"The radio frequency spectrum is a vital and limited resource. Increasing demands upon it are being made by a wide variety of government and commercial services. The result, of course, is increased pressure upon frequencies allotted to radio amateurs.

"Fortunately, the enormous benefits flowing from a strong amateur radio service are recognised by many governments. The world is advancing technically and nearly every nation is experiencing the need for a large cadre of trained engineers and technicians. However, the increasing frequency demands of other services pose a threat to the amateur radio international allocations, and this must be effectively countered if we are to emerge from the 1979 World Administrative Radio Conference with frequency resources which will assure the future growth and development of worldwide amateur radio.

"To this end, each radio amateur can help by:

★ *assuring that his fellow amateurs are well aware of the nature and importance of the conference;*

★ *working with his fellow amateurs, his local radio club, and his national society to assure that a proper understanding of and appreciation for the benefits of amateur radio exists at government levels; and*

★ *encouraging and assisting wherever possible in the preparation of a national policy which will assure allocation of adequate radio frequencies to meet the needs of the amateur radio service in the years ahead.*

"Each of the member countries of the International Telecommunication Union carries a vote to the World Administrative Radio Conference. Decisions on frequency allocations are made by majority vote. It is of vital importance to each radio amateur in the world that his country's vote is cast in support of the modest requirements of the amateur radio service. YOUR help may tip the scales to the advantage of radio amateurs throughout the world for years to come."

73,
(signed)
NOEL B. EATON VE3CJ
President, IARU

The Calendar says that IARU activities are oriented strongly toward making certain that the amateur radio service is in the most favourable position possible entering this Conference. To this end, IARU officers and staff travelled extensively during the year to discuss WARC plans with the officials of member-societies. During each visit, the member society is urged to maintain the closest possible liaison with its government. One goal is to have the radio society consulted by the government during the formulation of the latter's conference policy between now and 1979. ■

THROUGH A GLASS DARKLY

"So, in the tempo of the times, it would be well to realize that amateur radio is subject to scrutiny. You all know about the squeaking wheel that gets the grease. The louder the squeak, the more the grease. The loudness of the squeak depends a lot on how many wheels are squeaking! You may not be aware of it, but the amateur population in the United States is decreasing at the present time by about 350 licensees per month. This is happening while all other services are increasing". Part of speech by FCC Commissioner Robert E. Lee as reported in QST Feb. '75.

FLEA RADIOS AND CB-ers

The April '75 issue of APO News carries an interesting article about interference on the legal handphone service by kids using pirate walkie talkies preventing communication between a helicopter pilot and surf life savers to locate a swimmer in difficulties between Broken Bay and Wanda in Sydney recently. The helicopter pilot could see the swimmer in trouble but because of the interference could not tell the shore life savers exactly where to find him despite constant repetition. The pilot asked the kids to get off the air but they refused in language which made further entreaties pointless.

The article did not say if the swimmer was ultimately saved but one trusts this occurred somehow. The article goes on to mention a steady stream of complaints from legitimate users of licensed equipment with their operations disturbed by illegal operators and that the APO will not have a bar of the claims being made for a citizens band by the so-called Australian Citizens Radio Movement. It also says the APO is going all out to nab the illegal operators.

(The WIA also will not have a bar of CB operations as confirmed at the 1969 Federal Convention onwards. See also page 8 AR Oct '74— Ed.)

PUBLICITY

From the "Radio Bulletin" (E & Mt. Dist. Rad. Club) April '75 comes a report about the inaugural meeting of the Nunawading Branch attended by the Mayor of Nunawading. In his speech the Mayor is reported as making the point that the general lack of knowledge about amateurs and amateur radio in the community was largely our own fault. He said that if we were to gain the co-operation and support of local and other levels of Government we must be seen to be active in the community. Amateurs have valuable skills and technical knowledge resources, he continued, which we should use to benefit the community as well as to enjoy our hobby. In these days of growing involvement in community affairs, we cannot afford to stay in the background, he said. Hear, hear.

ROYAL AUSTRALIAN SIGNALS ASSOCIATION OF NEW SOUTH WALES

Lt Col Tony Ballantine VK2AAA advises that the Royal Australian Corps of Signals celebrates its 50th birthday this year.

The Corps was formed in 1925 and has distinguished itself in action in three subsequent wars. Many of its members have been decorated for bravery as well as distinguished services in military communications in peacetime.

Amateur Radio generally and the Wireless Institute in particular, has also numbered amongst its ranks, many past and present members who have served in signals. Mutual interests have always helped to maintain closest links between Signals and their civilian counterparts.

As part of the anniversary celebrations a world wide amateur radio link-up is to be conducted from the Australian Army School of Signals at Watsonia, Victoria, and all Interes'ed members are asked to note the date, Saturday 8 November 1975. More details are to follow in later editions of AR.

Royal Australian Signals Association of New South Wales will be participating with VK2ANE the official amateur radio station of the 8th Signal Regiment, Lidcombe, New South Wales. Many other VK2s are expected to join the activity and we hope to welcome all other interested VKs.

IARU AND POSTAGE STAMPS & REGION 1

The IARU Region 1 Conference held in Warsaw in May was honoured by the Polish Government by the issue of an IARU commemorative stamp (and special first day cover) to the value of 1.50 zt. The Region 1 conference, advised Noel Eaton VE3CJ, President of the IARU, who attended it, joined Region 3 in the latter's decisions relating to worldwide exclusive amateur bands on 1.8, 3.5, 7.0, 14, 21 and 28 MHz plus 3 new bands in the region of 10, 18 and 24 MHz and the retention of at the very least our present VHF, UHF and SHF bands. He also said there were some minor differences between the two Regions' positions representing only different conditions in them. It is hoped that the Region 2 meeting in Miami next April will take up a similar position.

SUNSPOT NUMBERS

Smoothed mean for Oct '74 was 30.2. Prediction for Oct '75 is shown as 7 in the smoothed monthly sunspot numbers. The provisional mean for Apr '75 was 6.2. Courtesy Swiss Fed. Observatory, Zurich.

LOOSE TALK

An amateur in Akron, Ohio (rather carelessly) announced his location at one of the large supermarket car parks and that he would be back on the repeater after some shopping. On his return all his ama'eur equipment, a stereo tape deck and other items had been stolen. Quote from QST Mar '75.

UHF TELEVISION

The ABCB in a news release of 12th May, advises again that it plans to introduce a limited number of UHF translator transmissions to improve reception of existing VHF programmes in certain locations in Australia, probably by the end of 1976. Advice is also given that the Board will be seeking still further consultations with industry to ensure that appropriate domestic receiving equipment, including UHF aerial systems and UHF adaptors for existing VHF receivers, will be available to viewers seeking to improve their reception by using the UHF transmissions in the areas where these new transmissions are planned.

DARWIN APPEAL

You will remember an Executive Appeal was made through Divisional Councils for members to contribute something towards helping Darwin amateurs to replace equipment they lost during Cyclone Tracey. An appeal is again made for contributors towards this worthy cause as the closing date of the appeal has now been set as 1st August 1975. If you have not already contributed, send a donation now, direct to the Executive Office, P.O. Box 150, Toorak, Vic. 3142, or through your Division.

SOLAR FLUX

"Use of solar flux as a measure of daily solar activity is now preferred to the use of the daily sunspot count because solar flux has been found to be more direct and objective. It is also much more sensitive to change than is the daily sunspot count . . . Solar flux is a measure of the level of radiation from the sun and, consequently, is an indication of the general state of the ionosphere . . . The values of solar flux broadcast by WWV (14 minutes past each hour) are measured at a frequency of 2800 MHz". Extracts from an interesting article by George Jacobs W3ASK and Theo Cohen W4UMF in CQ Mar '75 describing solar flux, geomagnetic activity indices short-term forecasting and related subjects. ■

COLOUR AMATEUR TV DEMONSTRATION

Friday 21.3.75 saw the first successful public Colour ATV demonstration transmitted in Melbourne on 426 MHz.

From the elevated QTH of Lou VK3ZYD at Mt. Dandenong, Don VK3YV/T transmitted three programmes to an audience of 94 people at the Moorabbin Radio Club's rooms. A distance of 30 km.

The entire programme lasted 65 minutes, and consisted of a monochrome video taped interview with Peter VK3BFG/T for 20 minutes, who explained details of the ATV scene and modulation systems. This was then followed by two excellent colour films from Fairchild showing the design and production of integrated circuits.

The colour segment lasted for 45 minutes.

Picture quality of both the monochrome and colour transmissions was excellent, and considering that the transmitter output was in the vicinity of 3 watts (yes, **three** watts!!), the demonstration was a tremendous credit to the capability of those involved.

Interference from outside sources was negligible, although during the monochrome segment, a little "breakthrough" from one of the commercial TV stations appeared on the audio channel. This was due to the close proximity of commercial TV transmitters.

The colour transmissions were received un-impeded.

Don's transmitter is all solid state and built up from an article described in VHF Communication. The transmitter antenna was an 11-element yagi.

After the colour demonstration further monochrome transmissions between Peter VK3ZPA/T located at Sunbury and Les VK3ZBJ/T at Frankston, were received. Both stations providing excellent quality pictures.

At the end of the evening, details of a simple to build 426 MHz converter for attachment to an ordinary TV set were discussed.

The converter used was that as described in Electronics Australia of January 1972, page 63.

The President, members and visitors of the Moorabbin Radio Club gratefully acknowledge the following amateurs for their efforts in presenting a fine display:—

Don VK3YV/T, Neville VK3YDR/T, Greg VK3YGB/T, Peter VK3BFG/T, John VK3YJB/T, Craig VK3ZBD/T, Les VK3ZBJ/T, Peter VK3ZPA/T, Les VK3BEN (supply of colour receiving equipment).

(Report from VK3UV) ■

TRADE NEWS

As part of a programme to increase interest in the 2 metre band, Dick Smith Electronics is giving one free set away for every ten sold. Purchasers of the new Icom IC22A can nominate the club or division of the WIA they would like the sets to go to. Once ten nominations have been given, a free set is donated to the particular club or division.

Tim Mills VK2ZTM, President of the NSW Division of the WIA is seen in the picture receiving the first Icom IC 22A from Harry Tyreman VK2BHT/G3SLL, Manager of the Amateur Radio section at Dick Smith Electronics. ■

"WILLIS" AIR-WOUND INDUCTANCES

Take the hard work out of Coil Winding, use — "WILLIS" AIR-WOUND INDUCTANCES

No	Dia Inch	Turns per L'gth Inch	Inch	B & W. Equiv.	Price
1-08	1/4	8	3	No. 3002	88c
1-16	1/2	16	3	No. 3003	88c
2-08	5/8	8	3	No. 3006	$1.06
2-16	5/8	16	3	No. 3007	$1.06
3-08	3/4	8	3	No. 3010	$1.28
3-16	3/4	16	3	No. 3011	$1.28
4-08	1	8	3	No. 3014	$1.42
4-16	1	16	3	No. 3015	$1.42
5-08	1 1/4	8	4	No. 3018	$1.58
5-16	1 1/4	16	4	No. 3019	$1.58
8-10	2	10	4	No. 3907	$2.29

Special Antenna All-Band Tuner Inductance
(equivalent to B. & W. No. 3907 7 inch)
Willis Pi-Coupler Unit — $18.00
7" length, 2" dia., 10 T.P.I. **Price $3.96**
Reference: A.R.R.L. Handbook, 1961
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QSP — WHAT IS AMATEUR RADIO?

How does one get amateur radio across to one's neighbours, the public at large, the non-technical administrators in the less-developed countries?

IARU Region 3 Association has put forward a policy that the ITU Radio Regulations should be amended to emphasise the philosophy of the amateur service —

(1) That the amateur service is a voluntary non-commercial service particularly with respect to providing emergency communications.

(2) That the amateur service provides for advancing an individual's skills in both the technical and operating phases of the art thus helping to provide a reservoir of trained operators, technicians and electronics experts and also provides an avenue for further investigation in the electronic art for those persons already engaged in the field.

(3) That the amateur service has a unique ability to enhance international goodwill.

This is designed to replace the existing definition of "a service of self-training intercommunication and technical investigations carried on by amateurs, that is, by duly authorised persons interested in radio technique solely with a personal aim and without pecuniary interest".

All this tends to be set out in lawyers' language. In plain language let's try and see what we can explain about amateur radio to people around us. Amateur radio, firstly, is a leisure activity like any other activity for the leisure hours such as mountaineering, golf, collecting stamps or art treasures. It is carried on by nearly a million ordinary people all over the world. To be a radio amateur requires study in order to pass examinations both technical and practical. In the process the elements of electronics must be learned along with the proper behaviour to be observed when communicating with other amateurs over the air. The electronics part of the hobby forms a solid foundation for those who wish to make a career in this science. The behaviour patterns follow, possibly dogmatically (for good reasons) the kind of conduct expected of one civilised person conversing with others. The technical skills and knowledge which the amateur acquires are necessary to enable him to operate his equipment at the best efficiency with the least interference to other radio users. Civilised society accepts that you cannot drive a car or pilot an aircraft without first acquiring a minimum standard of skill to pass exams. The amateur must know not only how to "drive" his transmitter (and other equipment) but he must also know how to mend it if it goes wrong. Thus a bridge is formed for communicating with other amateurs.

Talking over the air with other amateurs poses some (common sense) restrictions. He must not discuss religious, political, advertising or business matters over the air. He is also forbidden to transmit music or entertainment forms and in most parts of the world, including Australia, he cannot send or process messages on behalf of other people. Bad language is strictly forbidden. Any reward in cash or kind from his operations on air renders him liable to severe penalties. Any kind of news about third parties is not allowed. But all this does not prevent him from talking about all kinds of other things to the other amateur he is in contact with in the next town or in some place half way round the world. The bulk of the contacts you might hear on the amateur bands probably would be in English but some would be in French, German, Russian or any other language under the sun.

An amateur could go on and on about his wonderful leisure activity. He could become as boring about his hobby as the golfer expounding at length about his strokes on every hole. What the amateur does with his equipment and how he does it is well known to any other amateur. His knowledge and experience are shared with others although an ordinary member of the public listening in would come up against an unusual array of abbreviations and symbols.

The possession of gear and operating skills allows the amateur to take his place at once in any natural emergencies which arise such as Cyclone Tracy which wrecked Darwin. Amateurs quickly set up channels of communications to the outside world. The licensing authorities readily set aside the rules to allow him to pass traffic for such extended emergencies knowing how amateurs train themselves to handle such traffic.

Each amateur takes pride in being an ambassador for his country and for his chosen leisure activity be he a pensioner or a schoolboy, a bed-ridden patient or an active sportsman, a busy housewife or a prince, a millionaire or somebody struggling to make ends meet.

The next time you need to tell someone about amateur radio why not let him read this as a starter. After all, if there was anything fundamentally wrong with the activity it would not have flourished so greatly as it has done during the past 70 years — The Executive ■

SCALAR ANTENNAS

Amongst the comprehensive range of SCALAR ANTENNAS there are some of special interest to the Radio Amateur. These include our VHF & UHF, Citizens Band Range, HF Mobile and Base Station Units for Land & Marine applications, for example . . .

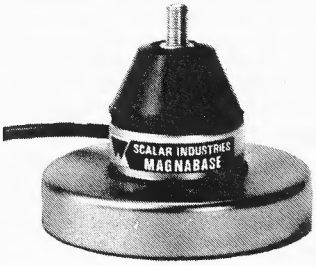
MODEL M25

For more efficient 2-metre performance use the SCALAR M25. A 3dB gain mobile, designed for use in the 140-175 Mhz band. The antenna is a 5/8 wavelength whip complete with integral loading coil. Constructed of fibreglass these antennas combine resilience with non-ferrous continuity for high quality performance and noise free operation.

AND SCALAR'S OWN

"MAGNABASE"

MODEL MGB



This high quality magnetic base may be fitted with any SCALAR whip. Instant installation on any flat metal surface.
Fully protected for scratch free mounting.
Complete with 12 feet of RG58CU coaxial cable.

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THE TRINITY ANTENNA

Bruce Hannaford VK5XI
2 Meath Ave., Athelstone, SA 5076

The name comes from the fact that the antenna is in effect three antennas in one. The antenna may be either a single band or a multi band design.

BRIEF DESCRIPTION

The Trinity Antenna has three switchable bi-directional patterns equally spaced at 120 deg. apart. By this means good all-round horizontal coverage can be obtained. The problem of directional dead spots of conventional fixed single antenna systems is thus overcome. The switching can be done at any point between the central junction of the antenna radiators and the operating position. Usually it is preferable to do the switching near ground level where it is easy to get at the switches which will usually be relays controlled from the operating position.

The space required is only back yard size if an inverted V design is used, or slightly larger for horizontal elements. The appearance is quite neat with few wires being used. The last two statements refer to an all band 80 to 10 metres design.

WHAT DOES IT LOOK LIKE?

From a birds eye view it resembles the letter "Y", except the angles between the straight lines are all 120 deg., and the lengths of the lines are all equal. From the junction of the three wires at a central insulator, a three wire feeder system is used. The feeder descends vertically to near ground level, say 5 feet high. At this point a switching system followed by a balun is used. A co-ax cable continues to the operating position.

HOW DOES IT WORK?

At the switching point, by selecting the correct feeders, any two of the three radiator wires may be used. This gives the choice of three bent dipoles facing directions 120 deg. apart. The third (unused) feeder wire and radiator wire are located symmetrically with respect to the equal and opposite fields of the other two feeder and radiator wires, so there is little coupling between the active and unused wires either on transmission or reception. To help keep a good balance in the three wire feeder and the antenna system, a 1 to 1 balun is used between the switching system and the co-ax cable to the equipment.

A PRACTICAL DESIGN:

An inverted V trapped dipole Trinity Antenna for 80 to 10 metres. This design uses manufactured traps of a type often advertised in this magazine. The kit contains two 7.1 MHz traps and a T-shaped insulator. It is called a Multiband doublet antenna kit. You will need to buy two kits and have a spare trap left over, or perhaps you can combine with a friend and obtain three kits between you. You could, of course, make your own; there is a design in the ARRL Handbook.

The three radiator legs are each a total of 54 feet long. Each leg is broken at 32 ft. 6 in. from the feedpoint by a trap and after the trap, a further 21 ft. 6 in. is connected. A three wire feeder must be improvised, such as 240 volt electrical wire. As the length used is only 30 to 35 feet, the losses will not be too high. Some three wire flex is reasonably good, or twist some .044 or .064 into a three strand feeder. The feeder system is non-resonant and untuned. The length required is from the top of the pole to the switching point. A single wooden pole 35 to 40 ft. high is used at the centre of the antenna system.

There are three egg insulators equally spaced around the top of the pole and as close to it as possible. The three radiators are joined to the insulators at the top of the pole and the end of the feeder wires connected to them. The feeder is then attached to the pole every 3 feet or so coming down to within 5 feet of the base. When the pole is erected the three radiators also serve as guy wires; they may be anchored to the fence through a couple of insulators. The pole and the anchor points may be moved to get the proper angles between the wires. If space does not permit pulling the wires out straight they may bend down near the end of each wire, preferably as little as possible. However, it is better to use a higher pole so the wires can be straight. The distances between the lower ends of the three antenna legs (if they are straight) should all be equal. Once the right pole position and anchor points have been located make everything properly secure for a permanent job.

The next task is to connect the switching system to the lower end of the three wire feeder about 5 feet from the ground. Various types of switching can be used; possibly the simplest system is to use two relays, each having one set of change-over or two way contacts. The moving arms of the relays connect to the balanced terminals of a 1 to 1 balun. The fixed, normally closed, contacts of the relays connect together and to one of the three feeder wires. The remaining two normally open contacts (one on each relay) are each connected to one of the remaining feeder wires. This means it will be possible to switch the balun to any two of the three feeder wires. Also there will be a short across the balun when both relays are de-energised. This is useful for testing the co-ax cable.

The unbalanced side of the balun is now connected via 50 ohm co-ax to the equipment. A light three wire lead is attached to the co-ax throughout its length to operate the relays. String the co-ax up about 7 feet high or bury it in the ground. Join one side of each relay coil to one of the three relay wires. This is a common wire and at the equipment end is connected to one side of the relay power supply. The other two wires each connect a relay coil via one of two separate on-off switches to the power supply.

With relay power supply on, check that with both control switches on, both relays are energised. Then check that each of the relays can be operated on and off by its own switch. When all is correct, the equipment may be switched on and tests made.

Remember to keep the power dow[illegible] when testing and avoid the short circui[illegible] which takes place when both switches are off.

Check the SWR on each band on each of the three usable switch combinations. These combinations are, either one on, or both on, and these of course give the three directional patterns. The readings should not vary significantly if the antenna has been carefully measured and constructed. The length of feeder wire that leaves the tightly twisted part and fans out to reach the insulators at the top of the pole is part of the radiator length.

Assuming you have achieved good standing wave ratios on all bands (10 metres will most likely be the worst) you can now do some listening checks to see how the directivity works. Rule up a writing pad with sets of three columns, one for the band, one for the callsign and one for the switching combinations.

The three possible combinations are de[illegible] noted as A, B & C and the switchin[illegible] system is marked to show what position is being used. Directivity patterns A, B & C are recorded for future reference.

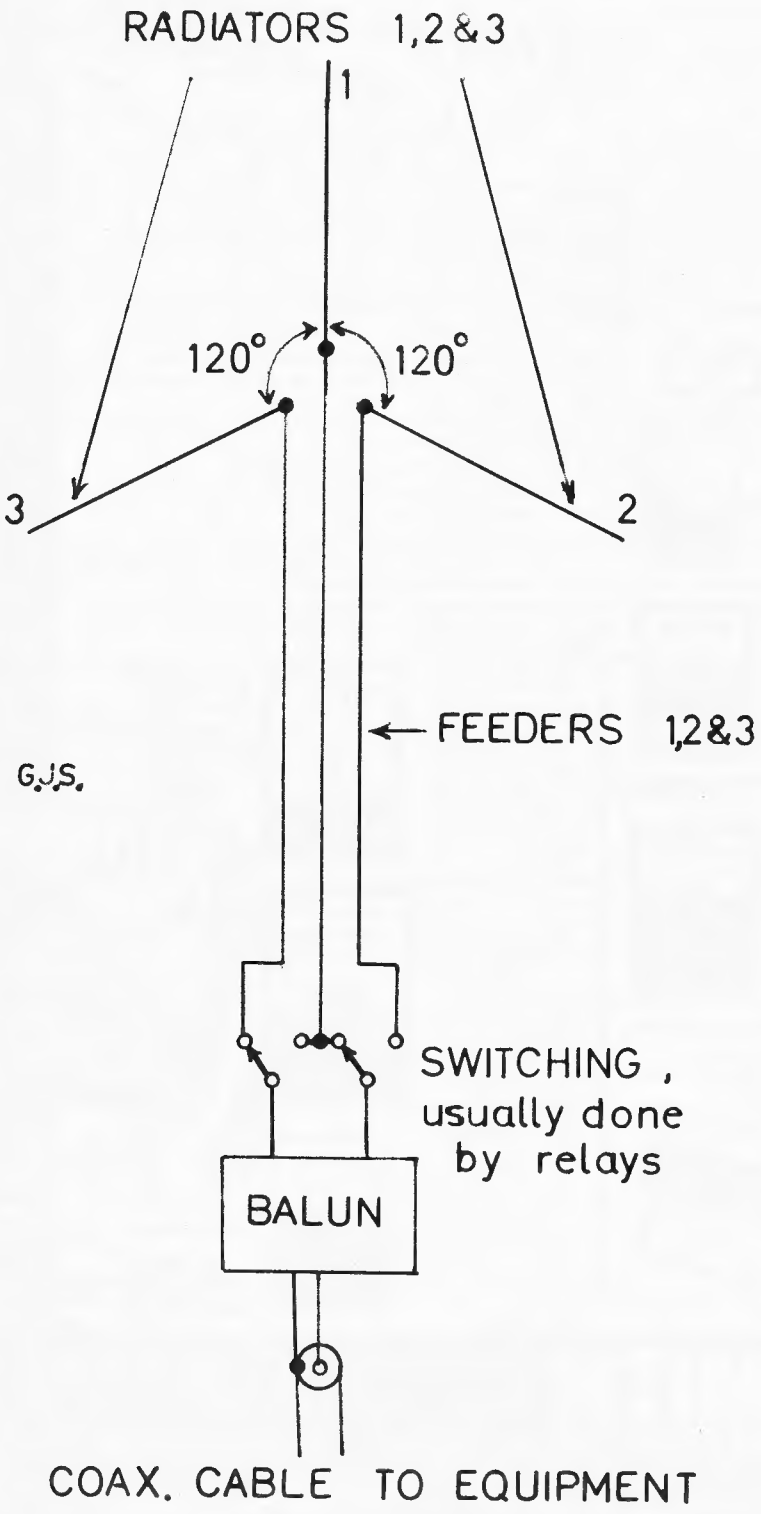
On 20, 15 and 10, it will often be found that changing the pattern will produce a change in the received signal level. If A produces best results but B and C are poor, A-BC is logged in the column next to the call sign. If A and B produce equal results but C is poor, AB-C is logged. If A is best, B is fair and C is poor, ABC is logged in that order. If all are the same, a dash is used, and no letters.

To obtain best results from the Trinity, It is very desirable to keep a systematic record such as this, perhaps by use of an extra column in the log book. Sometimes there will be little difference between the positions, but often one or more positions are about two S points down on the best position. When this happens it shows the benefit of not having only a single fixed antenna in the position of the poor signal antenna combination.

With this inverted V design, very little directivity is noticed on 40 and 80, showing that a ½ wave inverted V is a good non-directional antenna. If a horizontal Trinity is used there will be considerable directivity on 40 and 80, as well as increased directivity on 20, 15, and 10.

In reception one point worth mentioning is that interference may be reduced by using a different pattern. Try for the pattern that gives the best signal to QRM ratio, but if your signals are poorly received, go to the best signal strength pattern for transmission. In group working some advantages may be gained by using different patterns for the various stations. This can be done for reception and also during transmission if your remarks are for the moment directed to one particular station.

Of course everyone will want to compare the Trinity to a rotary beam, but the comparison is not really possible. A beam has only one main lobe in its pattern but the Trinity has many; secondly, the beam will give the impression of great gain as it is rotated simply because of the great attenuation off the back. The actual forward gain compared to a dipole is only about 1 to 1½ S points in most cases and it could well be that the Trinity will equal this, but operating the switches will not produce the same spectacular results as a rotary beam. Remember that the main advantage of the Trinity is good all round coverage without dead spots. It is not claimed it will out-perform a beam. When transmitting it will be found that signals received by a distant station will change in a similar manner to that noticed in reception. There are of course many more points that could be mentioned, however you will no doubt find great pleasure in discovering them yourself as you use the Trinity.



OTHER DESIGNS:

A G5RV design is a good proposition, the radiator lengths are very similar. Make a three wire radiator top and use a three wire open wire feeder with the three wires equally spaced from each other. The bottom end of the three wire feeder is switched in the same manner as described for the previous design. The balun will have to handle high standing wave ratios so use a high power job for safety.

A Tuned Feeder Zepp design with three 33 feet radiators and a three wire 33 feet tuned feeder system with switches at the bottom end is a possibility. By using suitable tuned circuits connected to any two of the three feeder wires, it will operate from 80 through to 10. However this design is difficult to handle with relay switching due to the high RF volts and tuned circuits that need switching. If the shack is under the antenna, these problems largely disappear and the switching and tuning can be done in the shack in comfort.

VHF DESIGNS:

At these frequencies it is possible to make a radiator and attached feeder out of a single piece of metal rod or tubing bent into a "L" shape. The combined length of two of the radiator portions should be an odd number of ½ waves to give low Z at the feed point. The rods are insulated, perhaps with a sleeve of insulating material to give the right spacing for the low Z feed line impedance. The three pieces are placed together, set at the proper angles to each other, and clamped together where the three feeder portions touch and run parallel to each other. The three feeder rods can form the main portion of the vertical supporting structure. At the base of the feeders they can be attached to a support such as a wooden post. The usual switching, balun and co-ax feeder are used as in the previous designs.

CONCLUSION

There are so many designs and variations that it is not possible to mention them all. Only representative types likely to appeal to amateurs have been discussed.

Several small details have been omitted that could have been included, however, if you are uncertain of any aspects, the author would be only too pleased to answer any queries. ■

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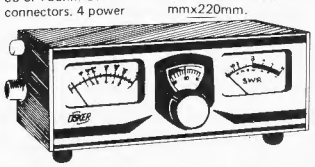

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SWR3 SWR Meter
Handy for Tx alignment with built in field strength meter. 5% accuracy 50ohm impedance. 100uA movement. 5 section telescopic antenna 145x50x60mm.

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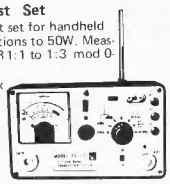
Multipurpose 27MHz test set for handheld walkie talkies & base stations to 50W. Measures Power to 5W: VSWR 1:1 to 1:3 mod 0-100% : Field strength : Generates 27MHz for Rx alignment : checks crystals : modulated 27MHz generator : 1000 Hz audio output : 5W dummy load With telescopic antenna, leads etc. 180x115x80



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Transistorised. Operates as G.D.O., Absorption wavemeter, oscillating detector. Frequency range 440kHz to 280 MHz : 6 coils : 500 uA movement : 9V battery operated : 180x80x 40mm.

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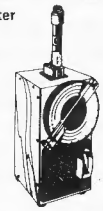

$142.00
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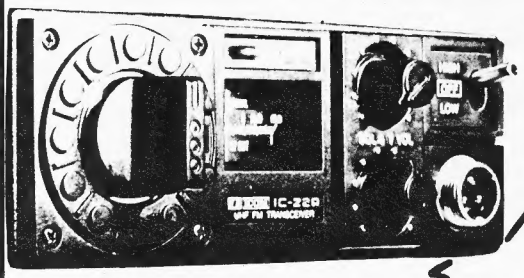

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16uA, 46 ranges doubler mirror scale protected. Ranges Vdc 0-0.5-2.5-10-50-250-1K: Vac 0-3-10-50-250-1kV: Adc 0-50u-5-50-500mA-10A: Ohms 0-16-160K-1.6-16M. Note all these ranges may be halved by VA/2 switch. 165x118x60

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SINCLAIR D.V.M.
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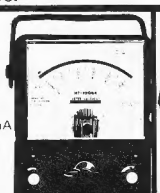
Overload protection 9.5uA movement 10A a.c. & d.c. 100K/V sens. Shockproof mech. Ranges Vdc 0-0.5-2.5-10-50-250-500-1kV: Vac. 0-2.5-10-50-250-1kV: Idc 0-10-250uA-2.5-25-250mA-10A. Aac 0-10A. Ohms 0-20-200K-2-20M. 180x130x80



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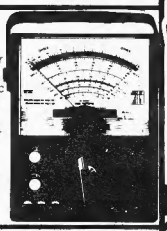
360TR
Transistor checker/multimeter, 34 ranges, 5" mirror scale, 8.5uA. 10A a.c. & d.c. Hfe to 500 ranges Vdc 0-0.5-2.5-10-50-250-1kV: Vac 0-5-10-50-250-1kV: Adc 0-10-25-500uA-5-50-500mA-10A: Iac 0-10A. Ohms 0-5-50k-5-50M. 180x135x85



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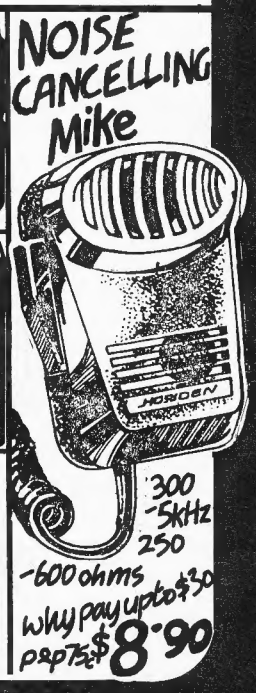
P&P $2.00

150FET METER
11M d.c. input, direct peak to peak reading on AC. 21 ranges, transistor bias measurement. Ranges Vdc 0-0.25-1-2.5-25-100-250-1kV: Vac 0-2.5-25-250-1kV and p-po-7-70-700-2800V: Adc 0-25-250-uA-2.5-25-250mA: Ohms 0-5-50K-5-50M-50ohm-5-50K. 160x110x50

$57.50
P&P $2.00



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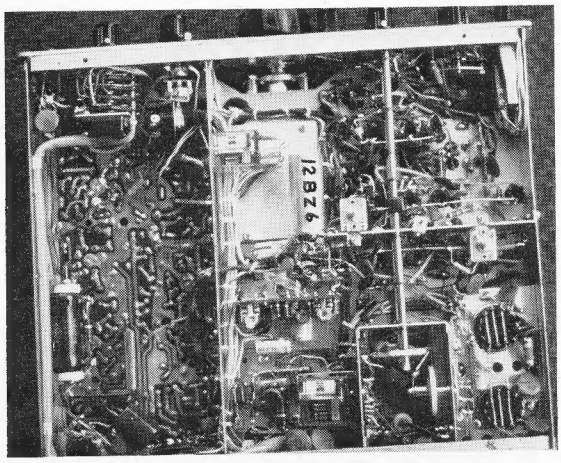
MORE MODIFICATIONS TO THE FT200



Three modifications to the ever popular FT200 are described. The first involves fitting a 12BZ6 as an additional RF amplifier. The second provides sharper RF peaking and more drive for 80 and 40 metres, while the third covers an improvement to the key click filters.

Athol Pritchard VK3CP
15 First Ave., East Kew, Vic. 3102

I have been a "home-brewer" most of my ham life, licensed as VK3CP in August 1931, and have always been interested in portable operation, but not with a car full of gear. A couple of married sons living in the country provided an incentive to do something about it.

As I was brought up on the *"care and feeding of vacuum tubes"* the logical choice, in my case, for a compact transceiver fell to the FT200, and with Heli whips mounted on the back bumper, fixed portable contacts have left nothing to be desired, VK and DX being a surprise and a delight.

Sensitivity on receiving was more than adequate on the three lower bands, adequate on 21 MHz, but less on 28 MHz. The various modifications were all tried such as 6GM6, 6EH7 frame grid tube, in adapters with very short leads and well by-passed. But the improvement was less than desired. Before this present modification the 100 kHz calibrator "S" meter reading on 21 and 28 MHz was S8 and S1 respectively with normal "S8" meter sensitivity on the lower bands. With the extra RF stage these bands now read S9 + 15 dB and S9 + 10 dB without regeneration or oscillation, and no change to the "S" meter sensitivity control setting, nor realignment of coils necessary.

The extra RF stage uses a 12BZ6 (to save a dropping resistor in the heater) and goes between the driver coils/grid coils and the first grid of the 6BZ6. It is mounted under the chassis adjacent to the 6BZ6 RF stage with its socket soldered by the edge to the vertical partition that is over this RF stage. There is no heat problem as the shield of this extra tube lies against the bottom of the perforated cabinet when this is in place and a self-tapper holds the shield firmly against same, making an ideal heat sink.

All the connections to the new tube are conveniently where they should be. The control grid and cathode resistors go to the same tag strip and are of the same value as used by the 6BZ6. The plate and screen voltage comes from the supply end of the screen resistor to the 6BZ6 RF stage and is open-circuited by the extra contacts on the antenna relay during transmitting. The screen voltage goes through a 4.7 k ohm resistor, and is by-passed at the socket with a .01 uF disc. (Refer Fig 1.) The slug-tuned plate coil has a 330 ohm resistor in series and is by-passed by a 50 pF capacitor at the junction of these two, and this gives extra sensitivity on the lower bands where the slug-tuned coil acts as an RF choke only. The slug-tuned coil is tuned to a little above 29 MHz approximately and this gives adequate gain on 21 MHz and the two 28 MHz ranges. If the coil is tuned to the working range of these bands, oscillation takes place. The coil can be set between 21 and 28 MHz but I prefer it just above the higher range on 29 MHz.

If desired the gain on 3.5 and 7 MHz can be increased by shunting the 330 ohm 12BY7 plate de-coupling resistor with a 150 uH choke.

The modification has been in use here for about five months, with no problems at all. The new tube is protected by the same circuitry as used with the normal RF stage. The AVC and "S" meter action is now better than ever, and taken all round I feel the improvement more than worthwhile. The slug-tuned former is ¼" diameter by 1" long and has 26 turns close-wound with 26 gauge cotton-covered wire.

The job takes about an hour to do after the various bits have been soldered to the socket. The components are wired to the socket before it is soldered to the partition.

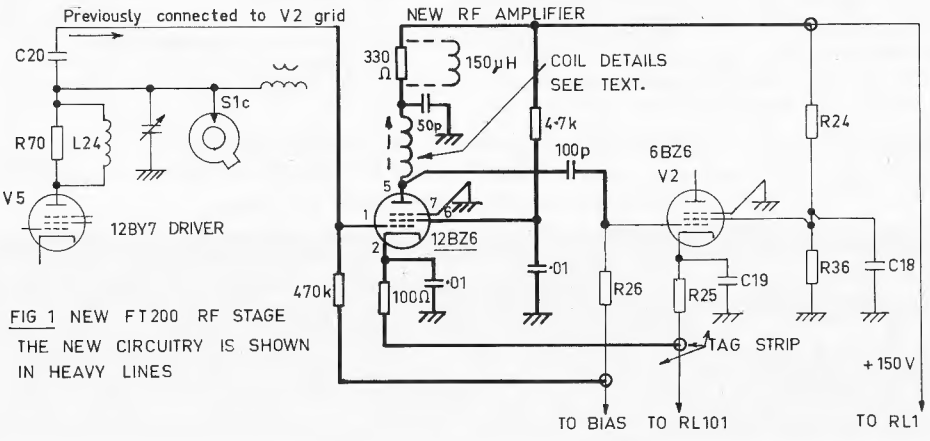


FIG 1 NEW FT200 RF STAGE
THE NEW CIRCUITRY IS SHOWN IN HEAVY LINES

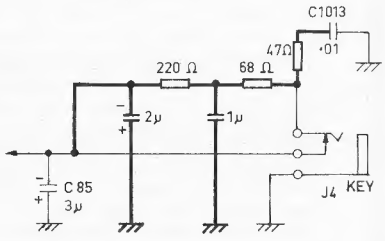
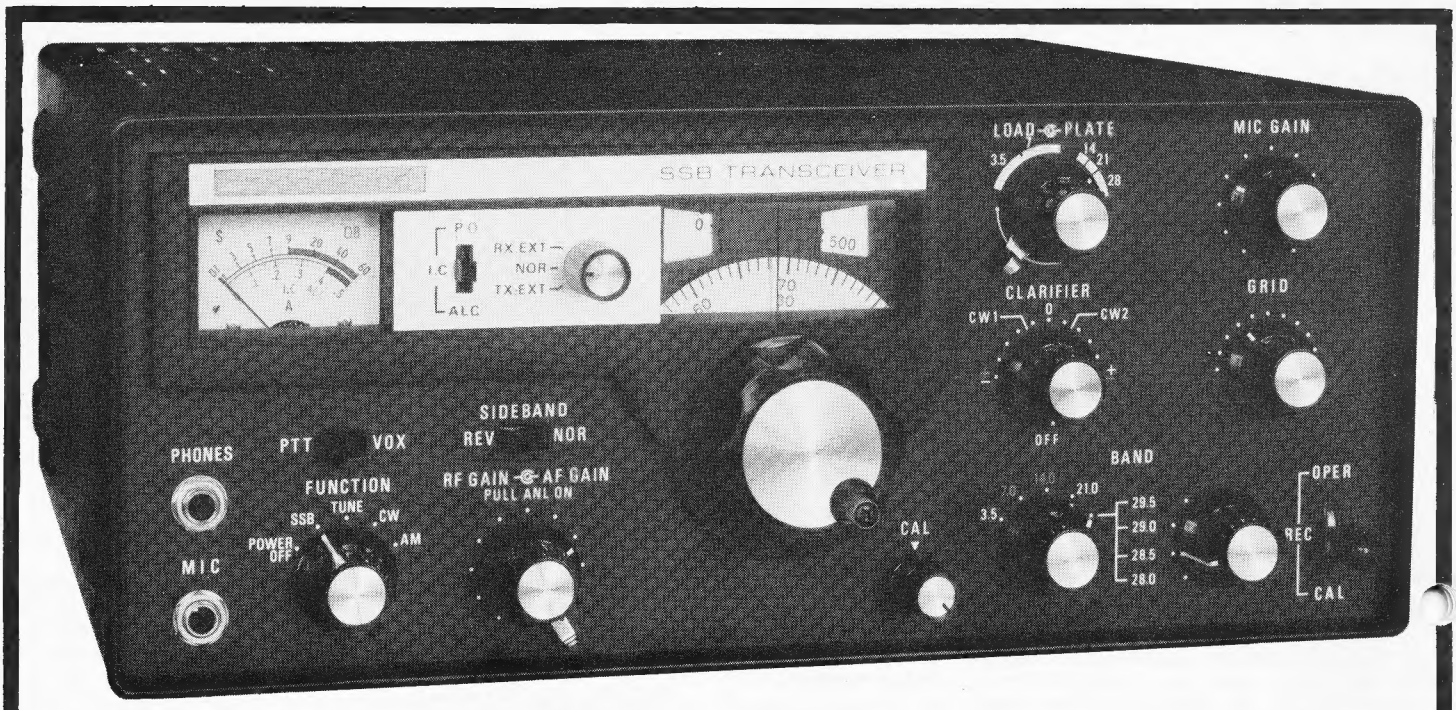


FIG 2 MODIFIED FT200 KEY FILTER

Two other small modifications are as follows:— I have sharpened up the tuning on 80 and 40 metres by increasing the value of the two 10 k resistors R72 (3.5 MHz range) and R73 (7 MHz range) to 47 k. This also gives more drive on these two bands.

The other modification deals with the keying filter. I removed the 330 ohm series resistor at the key jack and replaced it with a 220 ohm and 68 ohm resistor in series (the 68 ohm nearest to the key), and a 1 mF capacitor on the junction of these two to earth. (Refer Fig 2.) (*Note—some models have a 680 ohm resistor instead of 330 ohms—ED).* Also a 2 mF capacitor in parallel with the 3.3 mF electrolytic capacitor. I added 47 ohms in series with the .01 disc that is across the key. This gives firmer keying without clicks. ■



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GENERAL DESCRIPTION

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Provision for use of optional external VFO, FV-200 VFO includes fixed channel facility.

Operates from conservatively rated separate 230 volt 50 c.p.s. AC power supply, FP-200, which includes built-in speaker. Transceiver incorporates power take-off and low level R.F. drive outlets suitable for transverters.

Cabinet and panel finished in black.
If required for novice use, the power can be easily reduced, and 11M installed in a 10M position. If a separate external crystal oscillator (not supplied) is used then fixed C.C. transmit operation would be possible, with tunable reception.

TECHNICAL DATA ( ) OPTION

MODE OF OPERATION:	SSB(A3J), PHONE(A3H), CW.
FREQUENCY RANGE:	3.5~4.0, 7.0~7.5, 14.0~14.5, 21.0~21.5, (28.0~28.5), 28.5~29.0, (29.0~29.5), (29,5~30.0 MHz)
FREQUENCY STABILITY:	AFTER WARM-UP, 100 CPS/30 MIN.
SPURIOUS RESPONSE:	BETTER THAN —40 db
ANTENNA IMPEDANCE:	50~100Ω UNBALANCED
CARRIER SUPPRESSION:	BETTER THAN —40 db
SIDE BAND SUPPRESSION:	—50 db AT 1000 CPS
3 RD HARMONIC INTERMODULATION DISTORTION:	—30 db (P.E.P)
TRANSMISSION BANDWIDTH:	3 KHz
RECEIVE SENSITIVITY:	0.5μV S/N 10 db
FILTER SELECTIVITY:	2.3KHz(—6 db) 4 KHz(—60 db.
I.F. MIXING BEATS:	50 db DOWN
IMAGE INTERFERENCE:	50 db DOWN
AGC CHARACTERISTIC:	AMPLIFIED AGC
RECEIVER OUTPUT POWER:	1 W (AT 10% DISTORTION)
WEIGHT:	17.6 LBS
DIMENSIONS:	13 ¼" wide, 5 ½" high, 11" deep.

Price, including sales tax, excluding freight:
FT-200B, including FP-200B Power Supply — **$449.00**

Prices and specifications subject to change.

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R. H. Wales VK3ACM
Samaria Roadside via Benalla 3672

These units are the hybrid type, the only valves used being a 12AT7, QQE02/5, and QQE03/20. The transmitter audio and crystal oscillator/ phase modulator stages are transistorised. The current drain of the units is as follows, receive muted — approx 90-100 Ma., full audio (receive only) — approx. 300 Ma., Standby — 1.2 Amp, Transmit — approx 7.5 Amp. The differences between the 1675 and 1677 are minor, although the power supply is considerably different in the '77.
High band 1675s and '77s should only require tuning up to operate on the various 2 Mx nets.

LOW BAND 1675s and 77s FOR OPERATION ON 6Mx - 52.525 Mc/s
Basic modification data as follows:

RECEIVER

Aerial coil: Add 6 turns of same gauge wire to "hot" end.

Collector coil: Add 8 turns of slightly smaller gauge wire to "hot" end, move collector lead from tap to "hot" end of coil, i.e. to trimmer.

1st mixer coil: Add 6 turns of same gauge wire to "hot" end. Disconnect lead from trimmer of the middle tuned circuit. Disconnect lead from trimmer of middle tuned circuit to RF stage collector coil, run a piece of enamelled wire from trimmer of mixer coil to lead on collector coil. This bypasses the 2nd tuned circuit.

Osc. Mult. coil: Add 6 turns to "hot" end (same gauge wire).

Oscillator coil: Add 8 turns to "hot" end (same gauge wire).

TRANSMITTER

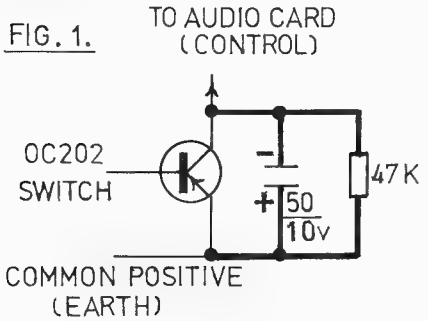
Remove RF filter (under chassis near relay).

T3: Replace windings with 30 turns of about 24 SWG wire, same spacing as original.

L1: Replace winding with 19 turns of same gauge wire.

2/5 plate coil: Replace with 16 turns, spaced 1½", same shape, same gauge, same diameter, tinned copper wire.

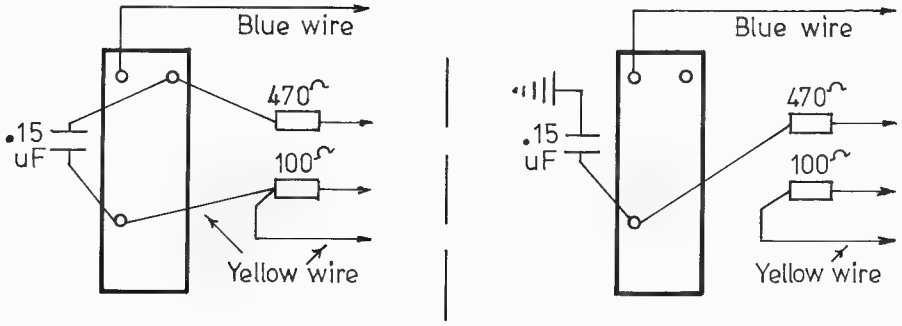
FIG. 1.



NARROW BAND

WIDE BAND

FIG. 2.



3/20 grid coil: Replace with 22 turns, spaced 2", same shape (centre tapped), same gauge, same diameter, tinned copper wire. Add 22 pF across link tuning capacitor (C25).

3/20 plate coil: Replace with 14 turns, spaced 2", same diameter, same gauge and shape, tinned copper wire (centre tapped).

CRYSTAL FREQUENCIES

Rx crystal frequency is calculated from the following:

$Fx = \frac{Fc + 16.755}{2}$ where Fx is xtal freq. Fc is car. freq.

For 52.525 MHz, the receive crystal is 36.640 MHz.

Tx crystal frequency is calculated from the following:

$Fx = \frac{Fc}{24}$ where Fx is crystal freq. Fc is carrier freq.

For 52.525 MHz, the transmit crystal is 2.18854 MHz.

LOW BAND 1675s and 77s FOR OPERATION ON 2 Mx NETS
Basic modification data as follows:

RECEIVER

Aerial coil: Remove turns from "hot" end until 8½ turns remain.

Collector coil: Remove turns from cold end until 6 turns remain. The collector of the AFZ12 is connected to the trimmer.

2nd tuned circuit: Remove turns from cold end until 7 turns remain. The 1 turn links on the above two coils are to be placed as close as possible to the "hot" ends of the coils.

1st mixer coil: Remove 1 turn from cold end. Remove turns from "hot" end until 7 turns remain. Coil will now be 7 turns tapped 2 turns from cold end.

Osc. multiplier coil: Remove turns from "hot" end until 6 turns remain.

Oscillator coil: Leave as original.

The mixer transistor in these low band units is an AF116N; this works quite well at 2 Mx and above, however some worthwhile improvement is obtained if this is replaced with an AFZ12 (same type as in the RF stage).

TRANSMITTER

Remove RF filter (under chassis near relay, 77s only).

Oscillator card (U3) Replace R5 (The 220K through the shield plate) with 100K. Add 200 pF between card and crystal (102 in high band circuit).

Change R11 (on 77 circuit), the 100K screen resistor for the 2/5, to 2 by 33K 1 Watt in parallel. Change R14 and R16 originally 4.7K 1 Watt, to 1.8K 1 Watt, although this is not strictly necessary, but the screen resistor (R11) *must* be changed to give adequate drive.

Remove the 22 ohm resistor from the centre of the final plate tuning capacitor. It is between the rotor and earth.

Disconnect the Tx audio filter if fitted (between mic. amp. and osc. cards).

Modification to the Tx coils. Note: *Keep spacing between windings the same.*

L2: Remove 1 pie winding, replace 10 pF with 4.7 pF.

T1: Remove 1 pie winding from each side.

T2: Remove 22 turns from each winding (approx. half).

T3: Remove turns until 9 turns remain on each winding.

L1: Remove turns until 4 turns remain.

2/5 plate coil: Remove turns until 4 turns remain, same shape as original.

Link: Remove turns until 1 turn remains, same shape as original.

3/20 grid coil: Remove turns until 4 turns (CT) remain, same shape as original.

Link: Remove 1 turn, leaving 2 turns, same shape as original.

3/20 plate coil: Remove turns until 4 turns (CT) remain, same shape as original. Cut capacitor so that 4 stator plates remain, and 5 rotor plates remain.

Output link: Should be 2 turns.

CRYSTAL FREQUENCIES

Rx crystal frequency is calculated from the following:

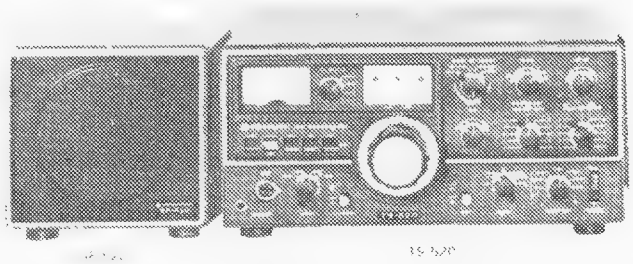
$Fx = \frac{Fc - 16.755}{3}$ where Fx is crystal freq. Fc is carrier freq.

For 146 MHz, the receive crystal is 43.08167 MHz.

HAM RADIO SUPPLIERS

323 ELIZABETH STREET, MELBOURNE, VIC., 3000
PHONE: 677329 – 674286
Also at 390 BRIDGE RD. RICHMOND. PHONE: 425174

KENWOOD SSB TRANSCEIVER MODEL TS-520

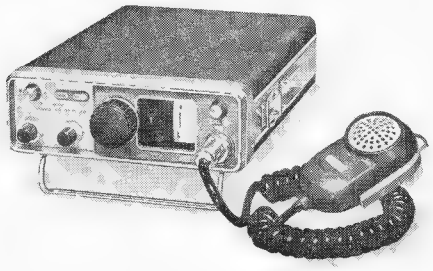


$550
WITH MICROPHONE

EXTRA SPEAKER
$25.00

The **TS520** is a highly sophisticated solid state Amateur Transceiver employing only three vacuum tubes. Operating on all amateur bands between 3.5 and 29.7 MHz, this unit is constructed modularly. Designed for operation on SSB and CW, the TS520 delivers more than 200 Watts PEP input. The low power consumption of the TS520, makes it ideal for portable or mobile operation using its own 12V DC inbuilt power supply. A 240V AC supply, also inbuilt, permits operation from your home location as well.

Specifications can be read from Page 2 of this Issue.



$235.00

KENWOOD TR-7200G
2 METRE FM TRANSCEIVER

This Transceiver, designed for use in the 144 MHz Amateur Band, employs F3 type emission with 22 xtal controlled channels and in addition has an external VFO terminal for both transmit and receive.

SPECIFICATIONS:

COMPONENTS	37 transistors, 2 F.E.T.s, 1 1C, 24 diodes
R.F. OUTPUT POWER	10 Watt and 1 Watt positions
D.C. CURRENT CONSUMPTION	Approx. 500mA on receive, 3 amps. on transmit (10W) 1.5 amp. at 1 Watt
DIMENSIONS	7-1/16 in. W x 2-3/8 in. H x 9-7/16 in. D
MAXIMUM FREQUENCY DEVIATION	± 15 kHz
SPURIOUS RADIATION	Less than —60 dB
RECEIVER I.F. FREQUENCY	1st I.F. 10.7 MHz, 2nd I.F. 455 kHz
,, SENSITIVITY	Less than 1 uV for 30 dB S/N
,, SELECTIVITY	20 kHz at 6 dB down
,, AUDIO OUTPUT	More than 1.5 Watts at 8 ohms loading.

UNIT IS SUPPLIED WITH CRYSTALS FOR REPEATER CHANNELS 1 and 4

HAM RADIO ELECTRONIC BARGAIN CENTRE

390 BRIDGE ROAD, RICHMOND 3121 PHONE: 42 5174

Plenty of BARGAINS for the Radio Amateur or the Hobbyist. Owing to the recent tariff cuts on electrical goods, we have obtained large quantities of components, transformers, panel meters etc. which can be bought at very reasonable prices while they last.

STEREO TONE ARMS with ceramic cartridge fitted **$5.90**

MONO TONE ARMS with crystal cartridge fitted **$2.00**

2N3055 TRANSISTORS with insulating kit **$1.00**

STOLLE 300 ohm FEEDER with foam dilectric **15c yd**

58 ohm COAX CABLE 100 yd Rolls, ⅛" diam. **$12 Roll**

52 ohm COAX CABLE ¼" diam. — **45c yd, 50c metre**

DOW KEY COAXIAL RELAYS 48 Volt D.C. operation **$15**

SPLIT STATOR CAPACITORS with screwdriver slot drive, 9 pF - 17 pF - 25 pF. Brand new Eddystone type ..... **$4.50 ea**

EX ARMY HEADPHONES approx. 600 ohms impedance. New, in sealed boxes **$2.00**

3" TAPE SPOOLS ..... **15c ea $1.00 for 10**

2" SQUARE FACE 0-10 mA METERS calibrated 0-60 ..... **$3.00**

EDGEWISE 0-1 mA METERS 2½" x ½" face 3" deep, calibrated 0-5 ..... **$3.00**

PANEL METERS 5⅞" x 4¼" with 0-1 mA movement, various scales on meters (gas analyser, etc.) **$5.00**

COMBINATION 240V AC 2400 WATT HEATER-FANS Tangi-type, use for blower, heater or cooler or both **$10.00**

30 kHz CRYSTAL FILTERS 10.7 MHz ..... **$5 ea**

3 ft. TWIN CABLE AUDIO LEADS with 3.5 mm plug fitted ..... **10 for $2.00**

CAR RADIO ANTENNAS 5-Section, lock-down **$3.50 ea**

PLESSEY SPEAKER SPECIALS

5" x 3" 3.5 ohm speakers with ferrite magnet **$3.00**

5" round 8 ohm, 4½ watts **$3.50**

5" x 4" 15 ohm, 3½ watts **$3.00**

5" round 15 ohm, 3½ watts **$3.00**

X20 Tweeters, freq. range 3kz-20kHz, 20 watts RMS **$6.50**

CAR SPEAKERS

7" x 5" 4 or 8 ohms, 5W, compl. with grille **$4.90**

9" x 6" 4 or 8 ohms, 3W, compl. with grille **$5.90**

CAR EXTENSION SPEAKER CONTROLS. Use both speakers together or sparately **$1.50**

WIRE WOUND POTENTIOMETERS in the following values:

5 ohm	2 watt	500 ohm	2 watt	**ALL**
10 ohm	2 watt	3000 ohm	2 watt	**$1.30 ea**

PLASTIC TURNTABLE COVERS (blue tint) 15 x 18 x 3½" deep **$5.00**

JACKSON SLOW MOTION DRIVES 6:1 ratio **$2.30**

NEW 240V AC TURNTABLE MOTORS 3 speed operation **$2.00**

CAR RADIO SUPPRESSOR KITS (2 condensers, 1 coil lead suppressor) ..... **$1 ea**

CAR RADIO SUPPRESSOR CONDENSER **50c ea**

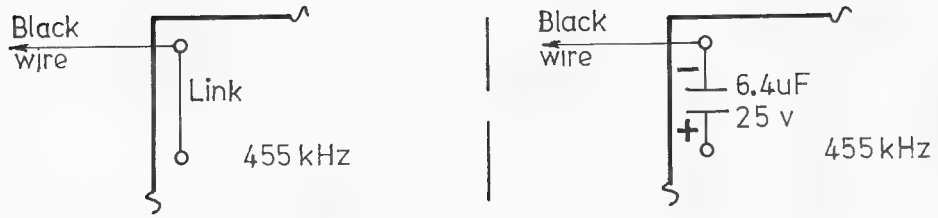
CIGARETTE LIGHTER ACCESSORY PLUGS **45c ea 10 for $4**

"MASPRO" TV BALUNS 300-75 ohm for colour TV ..... **$2.50 ea**

STANDARD BLACK AND CLEAR TV RIBBON **15c yd**

MAIL ORDERS WELCOMED. Please allow pack and post on items listed on this page. If further information required send a stamped S.A.E. for immediate reply from the above address.

FIG.3.



2nd IF BOARD CONNECTIONS.

Tx crystal frequency is calculated from the following:

Fx = Fc / 36 where Fx is crystal freq. Fc is carrier freq.

For 146 MHz, the transmit crystal is 4.05556 MHz.

TUNING UP PROCEDURE, BOTH 2 and 6 METRES

RECEIVER

The Rx has a 1st IF of 16.755 MHz, and this is mixed with a 17.210 MHz crystal to the 2nd IF of 455 kHz. The Rx filter is on 455 kHz. It is essential that both IFs are lined up *correctly* before the front end alignment is commenced. The correct peak for the cores in the 1st IFs is the one *farthest* from the middle, i.e. cores should be fairly close to the *top and bottom* of the cans. If the cores are peaked near the middle of the can, the mute circuit may not function correctly on *weak* signals. For more details on the IF alignment refer to a manual on the 1677.

I have found that with most units the IFs are reasonably good, the 1st IFs may need a slight touch up on a weak signal. Now onto the alignment details for the front end. It is a good idea to have a Tx on the frequency to give a really potent signal source to start with. Other equipment required is a stable signal generator, and a fairly high impedance multimeter, and if possible a 25-0-25 uA centre zero meter.

Plug in the Rx crystal, connect a high impedance meter to emitter Ts3 (i.e., lug on stand off), set meter to 3 volt range. Adjust C6 for max reading, making sure that crystal starts reliably. Connect meter to the test point on the 2nd IF card, set to 50 uA range. Feed in a fairly strong signal, then as Rx is peaked up decrease the input signal, whilst still maintaining a useful indication on the meter. Finally peak all trimmers and cores on a *weak* signal. It takes a fairly strong input signal to get an indication from this IF testpoint even when using a 12 uA meter. So final peaking may have to be done by "ear".

Setting Rx on frequency is done as follows:

Connect a 25-0-25 uA meter between the black wire on the audio card and positive, and with an input signal on exactly the right frequency adjust the coil in series with the crystal to give zero reading on the meter.

NOTE: For all *receiver* testpoints the common or meter *positive* connection is receiver *positive.* The *chassis of the RF unit* is a good place to which to connect the meter common lead. The plus and minus rails of the unit are isolated above ground. Care should be taken when working on the Rx. The manual suggests that the voltage regulator stage be disabled when working on the unit, as if the regulated line is accidentally shorted (the whole Rx excepting the audio power stage is supplied via the regulator stage, an AC128) then the regulator transistor will be destroyed.

TRANSMITTER

Plug in crystal, connect a meter to M1. Chassis of the unit is common for all Tx test points except 3/20 IG. Tune L2 and T1 for max, use 300 uA meter range.

Connect meter to M2, 300 uA range, tune T2 for max.

Connect meter to M3, 300 uA range, tune T3 for max.

Connect meter to M4, 300 uA range, tune L1 for max.

Connect to M5 and M6, 1 mA range, tune C23, C25 and C29 for max (may be necessary to adjust the coupling links).

Adjust final tuning and coupling for max RF power out. It is a good idea to recheck these adjustments.

Deviation may be set by getting a report on air or by using a deviation meter.

If the transistor whine particularly with the 77 is bad, this may be reduced by soldering a braid between the shield plate on the osc. card and the main chassis; this provides a "better" earth connection for this shield although it is screwed to the chassis.

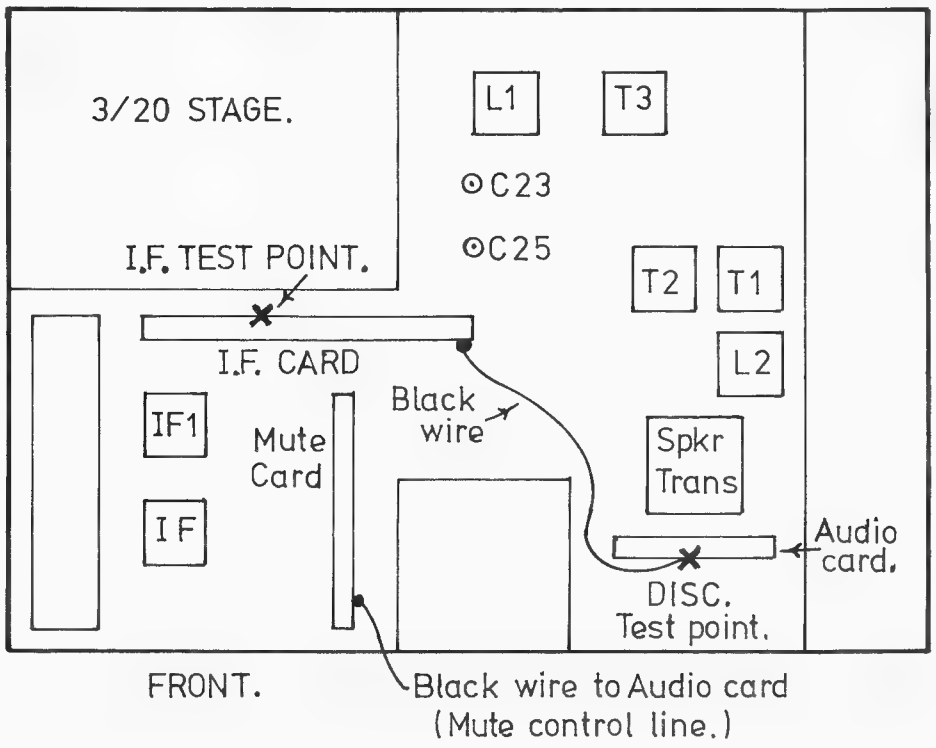
The amount of drive available may not be high but the Tx final (3/20) does not seem to need much drive to get 25 Watts out. 500 uA of drive seems to be adequate, however the more drive you can get, the better.

When the Tx coils are being modified (particularly for 2 Mx) is it a good idea to check the coil with a GDO and pre-tune roughly to the frequency that it is required to tune, before placing the coil back in the unit. This makes alignment a lot easier (it is quite possible to tune the 2 Mx unit up on 128 MHz).

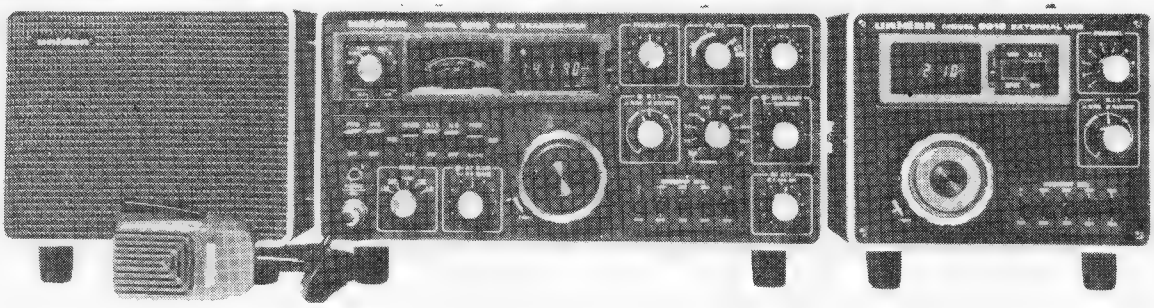
Also, when first tuning up the unit do not run the transmitter for too long a period of time, as some stages will be without drive (and hence some of the operating bias) which may cause the valves to overheat. So, only push the button for short periods until all stages have drive.

This concludes the basic data necessary to get the units going on the required band. There may be short cuts to some of the modifications, but this is what I have done and the results are good. Care must be taken when working on these units. The Tx coils are awkward to remove and replace, and there is quite a lot of work required in converting the low band units to high band. But, provided you have the time and patience, the results are well worth while.

FIG.4. TOP VIEW.



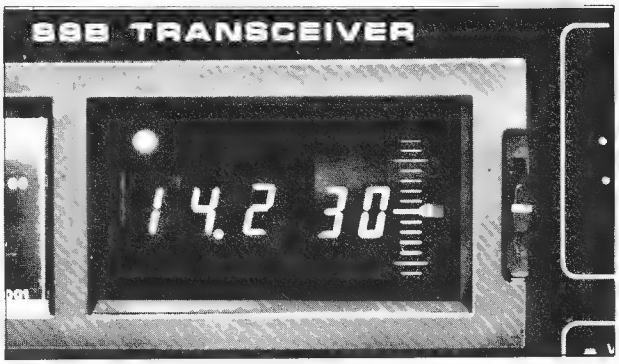
VICOM INTERNATIONAL PTY LIMITED Manager: Peter Williams



UNIDEN 2020 PLL DIGITAL SSB TRANSCEIVER

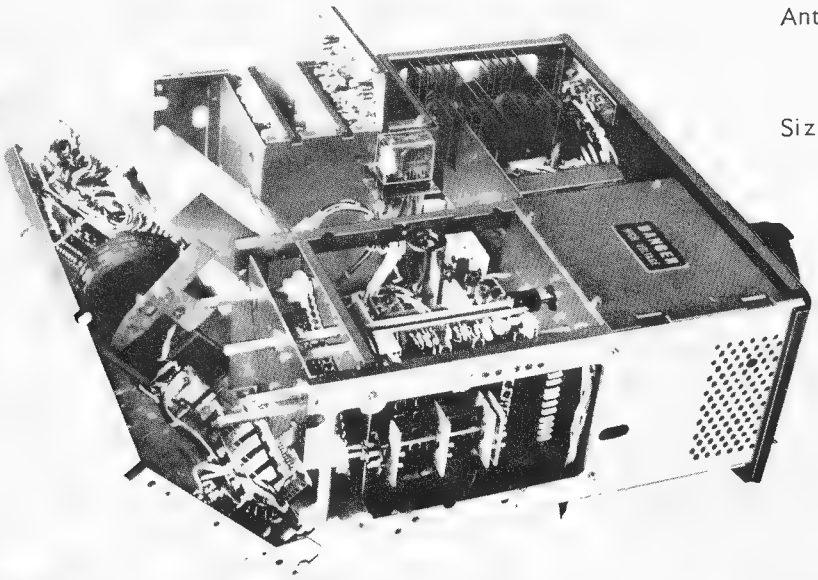
FEATURES –

* Frequency display on LEDs down to 100KHz and remaining 99KHz by a rotator–drum in combination.
* Phase Locked Loop (PLL) circuitry).
* Superior quality VFO – because each VFO range is only 100KHz, the linearity, temperature characteristics and effect from shock and vibration parameters are much better.
* High quality 8 pole crystal filters specially designed for the Uniden 2020.
* Dual range selectable clarifier, ± 5KHz or ± 1KHz.
* 6146B x 2 finals, built–in cooling fan.
* Noise blanker and fast/slow AGC control together with 70 db attenuator.
* 52 transistors, 16 FETs, 18 ICs, 154 diodes, 3 valves.



SPECIFICATIONS–GENERAL

Bands: 80,40,20,15,10,11, WWV
Modes: LSB, USB (A3J), AM (A3), CW (A1).
Stability: During warm–up less than 300 Hz, after 100 Hz during any 30 minutes.
Ant: 50–75 ohms impedance unbalanced, nominal.
240V AC or 13.8V DC (includes built–in DC supply) Rx 2amps (heaters off) 7 amps (heaters on) 22 amps peak transmit.
Size: 360 x 165 x 333 mm. Weight 18 Kg.



RECEIVER:

Sensitivity: 0.3uV for more than 10db S/N.
Selectivity: 2.4KHz nominal bandwidth at 6db
4.0 KHz at 60db down.
Harmonics: Image rejection better than 50db.

TRANSMITTER:

Input Power; 200 watts pep, 100 watts AM.
Carrier suppression: –50db or less
Sideband suppression: –50db or less (at 1000Hz)
Spurious radiation: –40db or less
Mic impedance: High
Price includes plugs, cables, mic etc. VICOM 90 day warranty.

$550

Head Office .... 139 AUBURN RD. AUBURN, VIC 3123. 82-5398

VICOM INTERNATIONAL PTY LIMITED Manager: Peter Williams

FT-101E

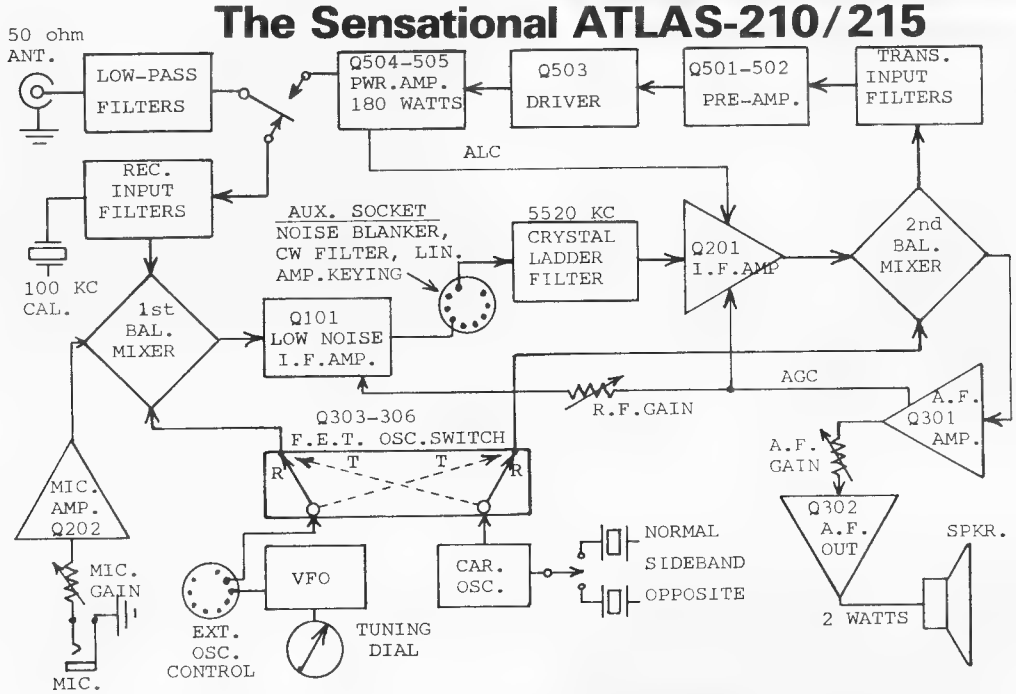
Following the successful FT101B comes the FT101E 160m–10m SSB transceiver which comes with lots of little improvements. Toggle switches on the front (replacing those designed for Japanese fingers) and the inclusion of a speech processor are some of the improvements. See the FT101E first at VICOM.

HF TRANSCEIVERS

Yaesu FT101B (160–10m) transceiver. $585
Yaesu FV101B VFO for FT101B/E. $102
Yaesu FT101E (160–10m) transceiver. $628
Yaesu FL2100B Linear Amplifier, $388
Yaesu FT75B mobile transceiver, $445
AC power supply $50
DC power supply $60
Yaesu FT201 transceiver incl. pwr. supply, $505
Trio TS–520 (80–10m) transceiver, $550 incl. mic.
Uniden 2020 (80–10m) transceiver, $550 incl. mic.
Atlas 210–215 solid–state transceiver, $570
Atlas 240v power supply, $150
Atlas delux mobile mounting bracket, $47
Micro–6 27MHz NOVICE transceiver incl. mic, $75.

HAM HEADQUARTERS!

The Sensational ATLAS-210/215



VICOM INTERNATIONAL PTY. LIMITED

SOLID STATE

5 Band — 200 Watts

NO TRANSMITTER TUNING

MODULAR CONSTRUCTION

ATLAS

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IC60 fm 10
transceiver incl
mic, bracket
~~$235~~ $210

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Features:
- outstandi
- 7.5 MHz b
- 0.1 µV squ
- 1 watt au
- solid desi

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VICOM INTERNATIONAL PTY LIMITED Manager: Peter Williams

money on a special Novice rig which isn't much
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D!! You will obtain the normal rig less one final
FO de–activated. When the big day comes, simply
ional tube and reconnect the VFO!!

ST GEAR

CS1557 CRO DC-10MHz $340
VT108 FET VOM 8 ranges 0.5 to 1.5kv, 11 meg input. 0.1 to 1000 meg, memory feture $85
AG202A AUDIO GENERATOR covers 20Hz to 200 10v rms output. sine and sq wave, ext sync $94
75mm scope 20mv cm sens, dc to 1.5 MHz $170
SG402 RF GENERATOR covers 100KHz to 30MHz

FREQUENCY COUNTER including 2 metre prescaler

O 275 0-15 MHz frequency counter $210

MONITOR SCOPE. The YAESU YO-100 monitor scope can be interfaced with most transceivers and can cover a wide range of modes incl RTTY. A two tone built-in generator at 1500 and 1900 Hz adds to the versatility. Price $190.

YAESU frequency counter $250. Covers up to 200MHz max sensitivity 20mV. hi-lo input impedance.

2 METRES SSB

SSM-EUROPA B transverter $224
YAESU FT220 ssb-cw-fm solid state transceiver. Price of $480 incl mod to use fm repeaters.
TRIO TV-502 transverter $243.

SPECIAL

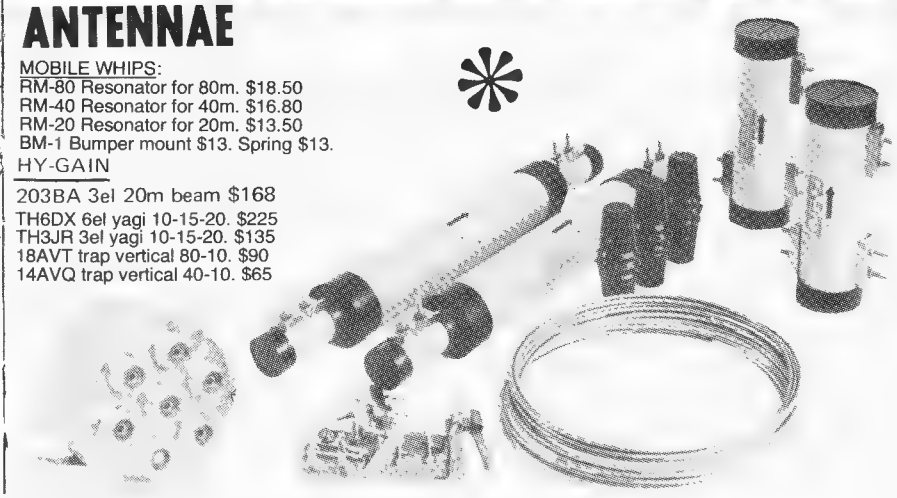
The Seiwa SU–710 70cm fm trans–ceiver runs 10 watts and is the ideal mobile rig. Complete with 1 channel (435.0) and mounting bracket, mic, cables etc. and VICOM 90 day warr–anty. Price $278.

ANTENNAE

MOBILE WHIPS:
RM-80 Resonator for 80m. $18.50
RM-40 Resonator for 40m. $16.80
RM-20 Resonator for 20m. $13.50
BM-1 Bumper mount $13. Spring $13.

HY-GAIN

203BA 3el 20m beam $168
TH6DX 6el yagi 10-15-20. $225
TH3JR 3el yagi 10-15-20. $135
18AVT trap vertical 80-10. $90
14AVQ trap vertical 40-10. $65



RAC ANTENNA BY VICOM

	Model	Imp	Freq	VSWR	PRICE $
BALUNS	BL-50A	52	1.8 - 38MHz	1.3:1	16.00
	BL-70A	75	1.8 - 38MHz	1.3:1	16.00
COAX SWITCHES (2 & 6 pos)	CS-2A	52	to 300MHz	1.3:1	23.00
	CX-6A(A)	52	to 500MHz	1.3:1	54.00
	CX-6A(B)	75	to 500 MHz	1.3:1	54.00
TRAP DIPOLES	III-N	52	7 to 28MHz	1.2:1	33.00
	AL48DXN	53	3.5 & 7MHz	1.2:1	33.00
	AL24DXN	52	7& 14MHz	1.2:1	26.00
	A-4VPN	52	3.5MHz	1.2:1	26.00
	A-8VPN	52	7MHz	1.2.1	28.00
LISTENER	L1	75	3 to 30MHz	—	15.00
BALANCED FEEDER	BTF-1	600	—	—	12.00

Power AMP for 2 metres. carrier operated relay, infinite VSWR protection, 60 watts from 10 watts in, BNC connectors. $89

VHF ANTENNAE

Scalar Mobile Whips:
M22 2m fibreglass ¼w $7.50
M60 6m fibreglass ¼w $10.70
M21 2m steel ¼w $6.90
LINDENOW 2m 5/8 whip $21, base $2.60
RINGO ARX-2 6db 2m gamma matched vertical $35
Extension kit to improve gain of the old AR-2, $12

ANT. ACCESSORIES

ME-1B SWR PWR METER 3-150 MHz $22
ME-UA UHF POWER METER $69
AS-GM gutter damps 2m $7.50
SH-7E lightning arrester $14.90
CO-AX 58u 45c per m
RB 2m mast amp (144-146 or 146-148) $32
VICOM 6m and 2m low noise preamps $18.75
VICOM 70cm low noise preamp $22.50
Rotator – CDR ham II 240v $165.

2 METRES FM.

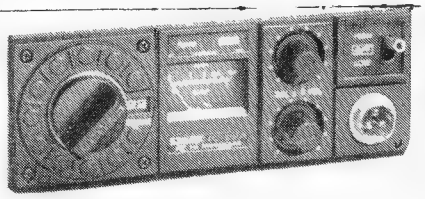
ICOM IC-21A 10w base station or mobile. Features variable pwr control, adjustable deviation, built-in discriminator meter, S meter, SWR meter and modular circuitry. Includes 3 chs 1-4-50. Price $298. Extra xtals $8.50 pr.

KEN KP202 handheld 2 watts. Incls 4 chs (1-4-40-50) $150.

TRIO TR2200G handheld portable transceiver incl 2 chs, 1-50. $150.

SEWIA SV-230 mobile rig, runs 25 watts! Price $210 includes 3 channels, mic, cables and mobile mounting bracket.

GET WITH THE STRENGTH! More IC22A 2m fm transceivers are sold in Australia than all other 2m fm rigs put together! No advertising gimmicks are necessary, it's simply the best! Featuring switchable power 1/10 watts, 22 channels, solid–state T/R. relay, PA protection, filtered dc voltages, the unit comes complete with mounting brackets mic, cables etc. and three channels 1/4/50. Price is $210 and includes the VICOM 90 day warranty. Spares and after–warranty service available.



Crystals for VHF transceivers are available for $8.50 pair + 50c P & P. Xtals outside WIA Band Plan are in short supply.

Vicom now have a range of suppression kits for the mobile enthusiast, including dc line filters, alternator and generator kits, ignition suppression kits and electroshield kits for the tough jobs

SCANNER

New

RLD NEEDS IS A GOOD $25 SCANNER KIT! 4-channel scanner board It is small sized, dicators which mount in small holes added in Two or more boards can be ganged for eight or Unit can be used with any AM or FM receiver or squelch and electronically switched crystals. with directly switched crystals can be easily 25 for the kit, including undrilled pcb, all compos, LED indicators. Add 60c for drill bit and $1 P

Vicom now has in stock components for the Amateur including plugs, LED's popular IC's and a large range of other solid state components for the home brewer.

QUALITY 2M FM RECEIVER MODULE. Ideal as an auxiliary monitor for the shack or osted (perhaps not a good idea!) this kit comes complete with a single channel oscillator ade 11 element if ladder filter. The price of $69 50 includes predrilled fibreglass pcb, all stal, filter, instruction manual. Add $1 P & P.

ctivity, 90dB adjacent channel rejection
dth
ensitivity, 0.3-0.5 uV for 20dB
utput
ly-shielded coils, stable cascode circuitry — no neutralisation required.

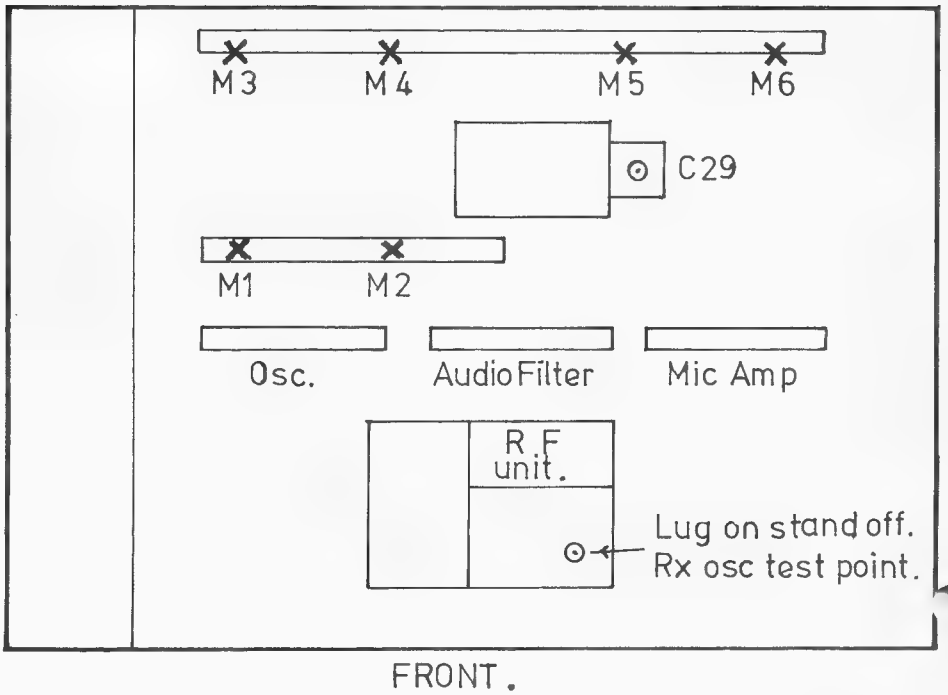
$69.50

A.C.T.:	Andrew Davis, 32 Kalgoorlie Cres, Fisher. Ph (062) 884899
QLD.:	DB Electronics, 21 Christine Ave., Miami. Ph (075) 351798
S.A.	Graham Stallard, 27 White Ave., Lockleys. Ph (08) 437981
Geelong:	Phil Fitzherbert, Ph (052) 436033
Newcastle:	Digitronics, 188 Parry St., Newcastle, Ph (049) 692040
W.A.:	Netronics, 388 Huntriss Ave., Woodlands, Ph (092) 463232
Darwin:	Distributor required
TPNG:	Distributor required

Distributors

Head Office .... 139 AUBURN RD. AUBURN, VIC 3123. 82-5398

FIG.5. UNDERNEATH VIEW.



What now follows will be some of the modifications to the units in general to obtain better performance on the amateur nets.

THE MUTE CIRCUIT

As original this works well but, on over-deviated and/or off frequency signals, the mute can have a tendency to close up on audio peaks. This effect is particularly bad if the unit is "hard muted".

To cure this, I have added a delay to the mute circuit, the result being that the mute may take a second or so to close.

Add a 50 uF/10V electrolyte and 47K resistor across the mute control line and place between the black shielded wire on the mute card (which runs to the audio card) and the earthy part of the board (i.e., *positive*). Fig 1 should explain this; also refer to the layout diagram.

THE RECEIVER FILTER

If you desire to change the filter to either a narrow or wide type, Figs 2 and 3 should assist in this. The wide filter has one less connection than the narrow one. When the filter is changed don't forget to alter the connection on the IF board also. The narrow filter has 7 cores and is meant for 5 kHz deviation, while the wide filter has 11 cores and is meant for 12.5 kHz deviation.

LOCATION OF TEST POINTS

Figs 4 and 5 should assist with locating the test points. The Tx test points are marked X.

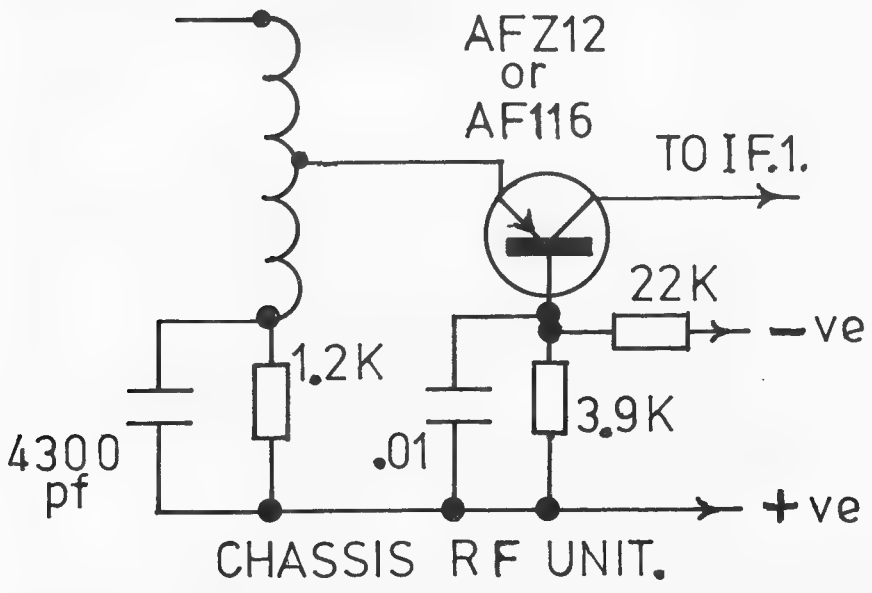
THE FRONT END OF THE 1675

The front end of this is similar to the 1677, but the 1st mixer is not biased, if it is left like this then the performance is very poor. It must be biased as in the 1677.

To do this, lift the base lead of the mixer transistor, connect a 22K resistor from the cold side of the oscillator multiplier trimmer to the base lead, connect a 3.9K in parallel with a .01 ceramic capacitor from the base to the chassis of the RF unit. See Fig 6. The emitter resistor *must* be changed to 1.2K, if this is not done then the mixer (AFZ12) may not last very long.

This completes the article. The complete circuit is too large to be reproduced here. Reference to the circuit should clarify any doubtful points. The units are capable of good results when tuned up correctly and should give years of satisfactory service. However, dry joints can be troublesome, and it is a good idea to have a spare AF116N and a AC125 on hand. Once the bugs are ironed out (if any) there should not be too many problems.

FIG . 6.



TECHNICAL EDITOR'S NOTE:

A note received from John Day VK3ZJF contains the following information which is relevant to the preceeding article.

No information on the relative performance of units modified by the different approaches is available.

(a) The receiver crystal should be cut for SERIES resonance.

(b) Only minor modifications to high-band 1675s and 77s will be necessary for operation on the two metre nets.

RECEIVER

No modifications normally necessary, just re-align front-end board.

TRANSMITTER

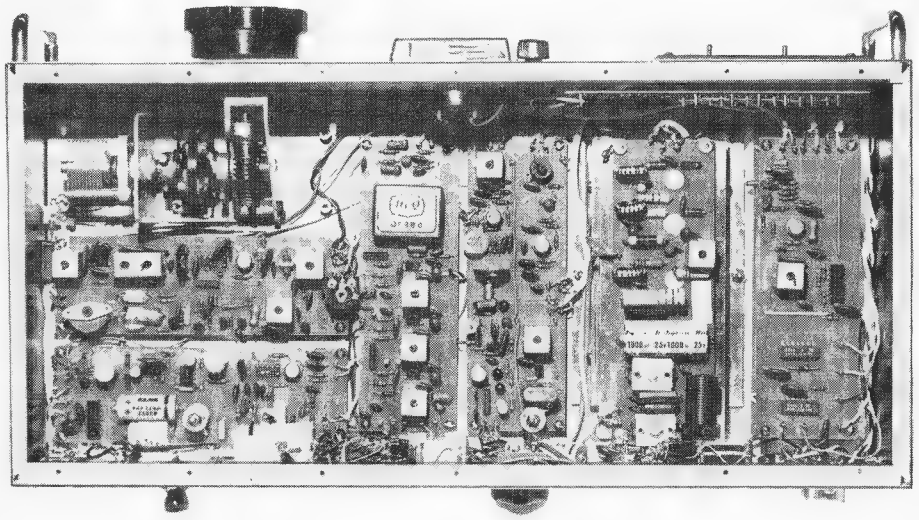
The amount of work required depends on the actual transmitter as in some cases, particularly late model 1677s, the transmitter will tune straight down to two metres. In other cases you may need as much as 10 pF across each winding of T1, T2, T3. Coil L1 will normally be fitted with a brass slug; remove this and replace with ferrite. If this is done and the remainder of the circuit tuned properly, you should have more than enough drive, even for 40 watts of output. Unfortunately, in the search for drive you may possibly need to rewind some coils for improved L/C ratio. In some cases it has been found necessary to add 1 turn to each side of L6 (3/20 grid coil) and 1 turn to each side of L10 (3/20 plate). The 0-25 pF trimmer C42 on the schematic is not included on most 1675s (and even some 1677s). For this use, a 3-30 pF Phillip "Beehive" type trimmer.

The use of a transmitter as a signal source is NOT recommended and should be avoided. ■

AMATEUR BUILDING BLOCKS

PART ONE

H. L. Hepburn VK3AFQ
4 Elizabeth St., East Brighton, 3187



In the amateur constructional literature, especially as it relates to receivers and transmitters, there has been an understandable tendency to describe equipment in terms of a specific finished product that does this and thus, measures so by so, and uses such and such components.

Yet, no matter how complex the final result, these pieces of equipment still consist of a finite number of functions combined together to do whatever the builder had in mind. Rarely, however, has the described article been exactly what the would-be constructor wanted, so that the tendency has been to abstract the parts of the published circuit which are of immediate interest to him.

The writer's main interest in amateur radio has been the evolution of home built equipment and it is the intention of this series of articles to describe a nummer of modules or building blocks. Each module is useful on its own, but modules may be combined to synthesise quite complex arrangements, although emphasis is placed on receivers, transmitters, frequency standards and frequency counters, these being the main pieces of *"hardware"* likely to be of interest to amateurs.

What the articles will, quite specifically, *NOT* do is to describe an all purpose, multiband, multimode "black box" which will be all things to all people. Rather, it presents a useful library of flexible and compatible units from which a selection can be made to build a wide range of end products.

Only components currently on sale in Australia (mostly through supply houses advertising in this and other local journals) have been used and suppliers are quoted where considered necessary. By and large there is nothing sacred about the devices used and, within reason, other equivalent devices can be substituted.

Section 1—

BRIEF DESCRIPTION OF MODULES

All the modules described in this series of articles are constructed on single sided circuit boards measuring 6 in. x 2 in. (152.4 x 50.8 mm). All have four corner mounting holes on 5.7 in. x 1.7 in. centres (144.8 x 43.2 mm) so that, if required, they can be stacked vertically to save space.

The functions contained in each module are as follows:

Unit A

This is a receiver "front end" module and contains —

(a) An RF amplifier whose gain may be fixed or manually controlled or AGC controlled;
(b) A balanced mixer
(c) A VFO capable of covering selected portions in the 1.5-12.0 MHz range;
(d) A fixed frequency crystal oscillator (3-18 MHz) which can be used in place of the VFO, making the module useful as an HF converter.

Unit B

This is an IF amplifier module for AM, CW or SSB. It can be operated on any of the common frequencies between 455 kHz and 10.7 MHz and the PCB makes provision for most (but not all) of the currently available filters. Home wound or commercial IFTs can be accommodated and an off-take is provided after the 1st IF amplifier so that the module can be used in a transceiver.

Unit C

This is a receiver "back end" module and contains —

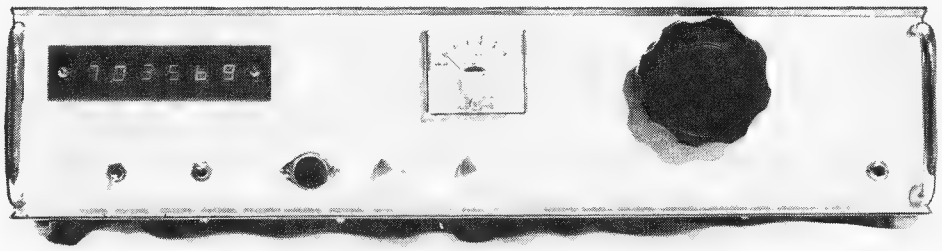
(a) A product detector;
(b) A crystal controlled BFO;
(c) An AM detector;
(d) An audio AGC generator;
(e) An audio preamplifier;
(f) Audio power output;
(g) "S" meter circuitry.

Note that units A, B and C combine together to make a single band receiver.

Unit D

This module contains the additional functions necessary to provide a low level SSB signal when used in conjunction with Units A, B, C above. On board are:

THE VK3AFQ SOLID STATE SSB TRANSCEIVER



A prototype of the solid state SSB transceiver, which can be assembled from circuit boards, to be described in this magazine by Harold Hepburn VK3AFQ, was tested by members of the Publications Committee. The unit submitted for test included the full digital readout dial.

Tested over a period of several days, overall performance was rated first class. Receiver sensitivity and selectivity compared favourably with several commercial transceivers. In fact, due to the very low internal noise level, signals were very easy to copy.

On air reports indicated that the transmit quality was crisp and very readable. Digital dial readout for transceivers seems to be very much a matter of opinion. Suffice to say that this one works well with only a slight amount of flicker appearing on the last (10 Hz) digit.

This project is recommended for those who have had some constructional experience and are familiar with the operation of SSB transceivers. ■

(a) A microphone preamplifier;
(b) A balanced modulator;
(c) A signal frequency balanced mixer;
(d) A (3-18 MHz) crystal oscillator.

Unit E

This is a 25/30 watt single band linear amplifier to build the signal from Unit D up to a useful level for "on air" use.

Note that units A through E inclusive combine to form a single band 25/30 watt SSB transceiver.

Unit F

This is a 1½/2 watt VHF single channel exciter (50-150 MHz) which, if required, can be frequency modulated. Its output level is adjustable so that the unmodulated output can be used, for example, as a carrier injection source for transverters. On board functions are —

(a) Microphone preamplifier;
(b) Frequency modulator;
(c) Crystal oscillator/tripler;
(d) Two doubler stages;
(e) Signal amplifier with adjustable output.

Unit G

This is a 10.7 MHz input FM receiver "back end". It contains —

(a) Filter;
(b) 10.7 MHz amplifier;
(c) Crystal oscillator/mixer;
(d) 455 kHz amplifier/limiter/detector;
(e) Audio preamplifier;
(f) Audio output;
(g) Squelch circuitry.

Unit H

This is a crystal oscillator on 10.00 MHz. Sufficient dividers are provided to give output at decade intervals down to 0.1 Hz. A separate, on board, dual flip flop can be used to divide any of the main clock outputs by 2 and/or by 4 so that outputs down to 0.025 Hz are available. Optional circuitry is provided to enable remote adjustment of the crystal frequency to be carried out. The unit can be used as a frequency standard and/or a counter time base.

Unit I

This is a display unit which is capable of operating in excess of 40 MHz for use in frequency counters, digital dials and timing devices. The number of digits displayed is optional with a maximum of six figures.

Unit J

This is a signal processing module accepting low level (20 mV) sine waves and outputting a TTL compatible waveform. Also on board are the necessary housekeeping functions for timing or frequency counting projects including a single band digital dial.

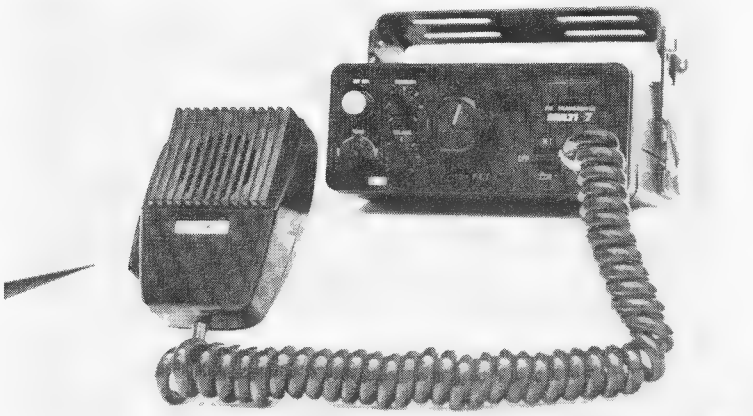
Note that Units H, I and J combine together to produce a 40 MHz, six digit frequency counter capable of a ±1 Hz resolution and that all units A through J make a SSB transceiver showing operating frequency to the nearest cycle if required. Figure 1 is a simple block diagram showing two of the module groupings possible. Specifically, units A to E produce a single band HF SSB transceiver while units H to J are grouped to give a 40 MHz frequency counter. It must be emphasised, however, that the grouping shown is not mandatory and individual modules, or parts of those modules, can be otherwise put together to achieve other end uses.

The writer is prepared to comment on, or suggest, other specific groupings or end products. A stamped addressed envelope for the reply is requested.

To be continued ■

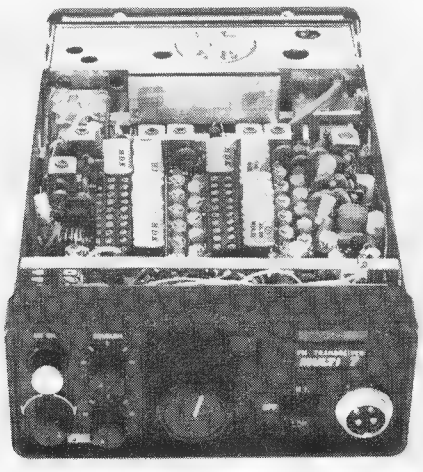
AN AR SPECIAL

A REVIEW OF THE MULTI-7 2 METRE FM TRANSCEIVER



In the December 1974 issue of Amateur Radio we reviewed the Icom IC22 and stated that more two metre FM transceivers would be reviewed in the future. Here then is the second in this series.

The Multi-7 is a product of the FDK Company of Fukushima, Japan. It is distributed in Australia by Sideband Electronic Sales and Engineering of Springwood NSW, who supplied the unit used in our review. Details of price and delivery can be obtained from the above company.



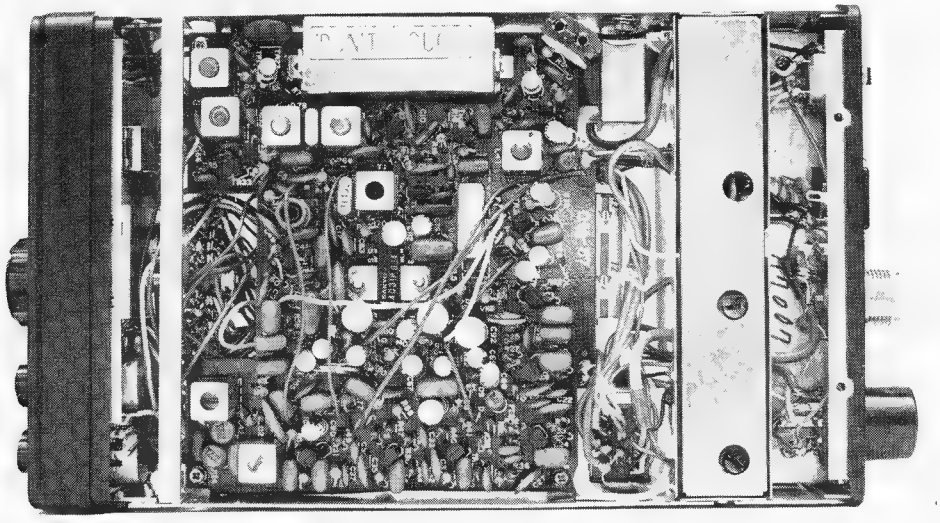
In keeping with the latest approach the Multi-7 has provision for 22 channels plus a priority channel and also an external VFO. There is no indication that the FDK Company produce a matching VFO nor is any information supplied on the use or construction of one.

Naturally, the unit is fully solid state and employs 27 transistors, 3 FETs, 1 IC, 1 SCR and 18 diodes. The Multi-7 is the smallest two metre transceiver currently on the Australian market. The overall dimensions are: 134 mm wide, 216 mm deep and 75 mm high. The weight is 1.6 kg.

No doubt, to match the non-reflecting finish of modern car dash boards, the Multi-7 is finished in a dull black plastic on the front panel while the metal cabinet is painted in satin black. The overall appearance is first class with colour relief provided by touches of satin chrome on the control knobs. The meter and channel selector are both illuminated from the rear and an *"on air"* indicator is placed to the right of the meter. Channel selector markings are unusual in that they are numbered for the frequencies commonly used in Japan, with the colour changing to signify either 144 or 145 MHz. As supplied by Sideband Electronics, 10 Australian channels are included, these being a receive and transmit crystal on every 100 kHz point from 146 MHz to 147 MHz with the exception of 146.6 MHz. In effect this allows operation on simplex channels 40 and 50 plus repeaters 1, 2, 3 and 4 and then the same four repeaters in reverse. Additional crystals are available from the distributor.

The Multi-7 is supplied with the usual accessories, a good quality dynamic microphone, mobile mount with quick release facility, DC connecting cable and spare fuses.

The transmitter is rated at either one or 10 watts output, this being selected by



A Review of the Multi-7 2 metre FM transc. a three position switch with "off" in the centre. The receiver section of the Multi-7 incorporates two interesting features which to date appear to be unique in a strictly mobile unit. First there is an offset tune control. This enables the receiver to be tuned a few kHz either side of the nominal frequency. This is achieved by pulling the second conversion crystal oscillator, hence the same frequency offset occurs on all channels. So that this control can be effectively used, a rear mounted slider switch changes the meter from its normal functions of RF output and receive signal strength to that of a discriminator zero indicator. The meter is designed to have its zero about a fifth of the way up the scale, so that the actual meter movement is rather small.

Power consumption is rated at 2.3 amps on high power transmit, 1.2 amps on low power transmit and 400 mA on receive. This is at a nominal input voltage of 13.5.

CIRCUIT DESCRIPTION

Apart from the features mentioned above, the circuitry of the Multi-7 is rather typical of modern thought in amateur 2 metre gear. It follows tried and proven methods. The receiver uses two dual gate Mos FETs in the front end, one for the RF stage and the other for the first mixer. The coupling between is via a three stage helical filter. This system is capable of good sensitivity combined with good immunity to strong out-of-band signals. The first conversion oscillator uses crystals in the 45 MHz region followed by a tripler stage. The receive crystals do not have individual trimmers as this function is well taken care of with the front panel "TUNE" control. It also saves considerable internal space and no doubt contributes to the overall compact size of the transceiver.

Many amateurs might query the lack of receive trimmers, however the fact is that even were these provided, there is no guarantee that the crystal frequency will stay put. With this system it is at least possible to compensate for temperature changes and off-frequency stations.

The IF strip is conventional with a 10.7 MHz, 455 kHz set-up. A standard Murata filter is used in the 455 kHz section, giving a band pass of 15 kHz.

Receive audio consists of a single transistor stage driving an IC as the output. Audio power is rated at two watts with 10 per cent distortion. The speaker size is 92 mm or about 3½ inches. It is mounted in the lid of the cabinet which can be either the top or bottom of the set, the two being interchangeable. This is a handy feature as it overcomes the problem of the speaker firing into the floor of the car.

Transmitter starts off with a 12 MHz crystal oscillator and as is usual is phase modulated. The modulator is followed up with a tripler and two doublers, two amplifiers, a driver and power output stage. High SWR protection is taken from a pick-up link at the output stage, fed to a silicone controlled rectifier which controls the supply voltage to the first tripler stage. I often wonder why some form of SWR indicator is not provided from this circuit. It might not be too difficult to incorporate. High/low power switching is arranged by reducing the voltage on the driver stage with a series resistor.

THE MULTI-7 ON THE AIR

The channel selector was rather stiff in its action and this, combined with a round knob set on a fairly cramped front panel, did not encourage channel swapping. The priority channel, rather quaintly called "MY" channel was easily selected by pushing the buttons. This selected "MY" channel regardless of the position of the main channel selector. With "MY" channel selected the main dial light was extinguished. The meter is rather small and difficult to read at a distance but nonetheless effective. This discriminator position proved most useful when used with the "TUNE" control. Stations off-frequency on simplex channels could be put right on the nose.

Received audio quality was good, but not outstanding considering that the speaker was rather larger than is usually found in this type of transceiver. The transmit frequency was checked on each channel and was found to have been set within ±150 Hz. Stability was exceptional. Checked two weeks later after having been put through all its tests, crystals were still spot on.

Deviation was set at 10 kHz as received from the distributor. Transmit quality was very smooth.

THE MULTI-7 ON TEST

A series of tests were carried out to determine the performance. The transmitter power output was measured with 13.5 volts applied to the set. In the high power setting, 11 watts was indicated on the Horwood PM502 meter with 1.3 watts in the low setting. Current drain was 2.4 and 1.0 amps at the respective powers. Receive current drain was 275 mA with the set muted, 200 mA with "MY" channel selected (Dial light out), and 350 mA at normal listening level.

Receiver performance was checked next using a Marconi TF995 signal generator tuned to channel 40 (146.0 MHz) and the following results were obtained. With the mute set to the just-on point a signal input of .3 uV opened the receiver. Quieting was 17 dB at .5 uV and 25 dB at 1.0 uV with a signal-to-noise ratio of 23 dB and 34 dB at the same two levels. We later discovered that the figures were better at 146.0 than at 146.5 MHz which indicated that the receiver was in fact peaked at a lower frequency. However, as the figures were actually better than the published specification, we did not attempt to repeak the front end. At a later date the receiver was repeaked with a very worthwhile increase in sensitivity. No figures were taken at this point. The signal strength meter was checked and the following calibration was recorded:

.5	1 uV
2	2 uV
4	3.2 uV
6	5 uV
8	8 uV
10	25 uV

Receiver audio output was measured with steady 400 Hz tone. At the onset of audible distortion one watt was indicated. Although this is well down on the specified two watts, no doubt more power would be delivered on voice peaks. All the above figures were obtained with 7.5 kHz deviation on the signal generator.

The front panel "TUNE" control had a total range of 10 kHz with the centre point at the three o'clock point.

INSTRUCTION MANUAL

Two manuals are supplied with the Multi-7 one of which appears to be fairly complete although it is written in Japanese. The second is written in rather odd Japanese English and contains basic operating information but little more. There is a circuit and block diagram but no printed layouts. Alignment and maintenance do not even rate a mention.

CONCLUSIONS

This little set is well built and attractive in appearance. It meets all the published specifications with the exception of audio output, however it would be wise to check the receiver front end alignment if you want all the performance you are paying for. With the number of channels included it represents very good value at the advertised price. ■

Completely Solid-State Choice of 40 or 80 METER MONOBANDERS

Designed and engineered for the ham on the move, single-band transceivers put the pleasure of mobile operation within the means of all amateur radio operators. Simple to install and operate, these compact units work directly off any standard 12V DC automobile battery. No transmitter warm-up time or intricate tuning is required. An easy to see Transmit LED Indicator, on the S-meter face, lets you know when your signal is getting out. And, you've never heard better clarity or experienced better performance from such as small, yet handsome, rig.

Experienced hams appreciate the Monobander selectivity, which minimizes all QRM distrubances.

MONOBANDER SPECIFICATIONS

GENERAL

Frequency Range	
MB-40A	40 meters (7.0-7.3 MHz)
MB-80A	80 meters (3.5-4.0 MHz)
Power Source Requirements	13.5V DC (nominal) at 5 amps CW, average 1.5 amps SSB transmit and 0.4 amps receive.
Modes of Operation	SSB or CW
I.F. Filter	Crystal lattice, 2.8 kHz bandwidth, 1.7 shape factor, ultimate rejection in excess of 100 dB.
Dimensions	3"H x 8.5"W x 9"D.
Weight	6 lbs.

RECEIVER

Sensitivity	Less than 0.5 microvolt at 50 Ohms for 10 dB signal plus noise-to-noise ratio.
Image Rejection	Better than -70 dB.
CW Sidetone	Optional MBCW accessory monitors CW keying.
Audio Output	4-watts with less than 10% distortion to 3.2 Ohm internal speaker.
Audio Response	Essentially flat from 300 to 3000 Hertz ± 3 dB.

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Commercial Kinks

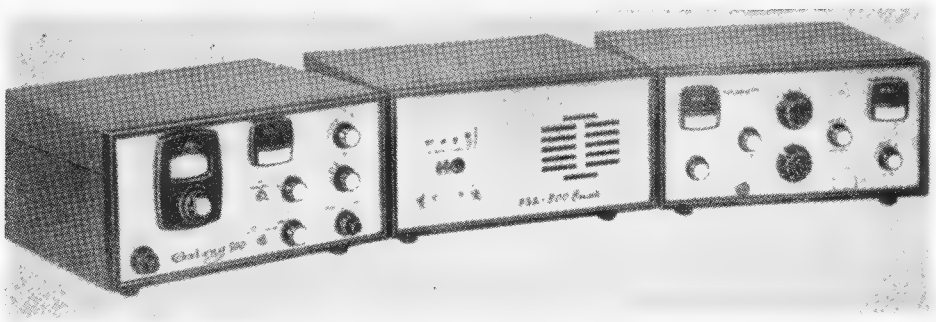
with Ron Fisher VK3OM
3 Fairview Ave., Glen Waverley, 3150

In May AR, I finished up on the subject of second hand amateur gear. This sparked off a thought that it might be a good idea to look over some of the older gear in this column from time to time. In doing so, I do not intend to give a full review of the particular piece, but more a general description of its electrical and physical characteristics, plus a photograph to aid in its identification. The whole idea is to help both buyers and sellers of second hand gear.

Perhaps there might be a piece of gear you are interested in. If so, let me know and it can be the subject of a future article. One point however, this does not apply to disposals gear. I regret that my knowledge of this type of equipment is limited.

THE WRL GALAXY 300

The Galaxy 300 was one of the first of the popular priced three band transceivers sold in the United States during 1962/1963. It sold in competition with the Swan 240 and the National NC-3. The Galaxy was the largest in size of all of these and measured 15 inches wide, 13½ inches deep and 7 inches high. It also had the highest power rating at that time with 300 watts PEP input to a pair of 6HF5s in the final.



Galaxy 300 transceiver with matching AC power supply and 2 kW linear. A 12V DC supply was also available.

The circuit worked on the single conversion principle using a 9 MHz IF with possibly the best filter in the lower priced transceivers. Frequency coverage was limited to the American phone bands with the exception of 40 metres. Actual coverage was 3.8 to 4.0 MHz, 7.05 to 7.35 MHz, and 14.2 to 14.4 MHz. As with most transceivers of the time, VOX and crystal calibrator were optional extras. Dial drive was smooth with a two speed planetary and gear arrangement. The meter was switched for final cathode current or "S" meter. An unusual feature was the use of two separate VFOs. One was used for 20 and 80 metre coverage while the other was used for 40 metres. They were both combined into the one enclosure.

Not a great number of these transceivers found their way to Australia. Sideband Electronics did import a few second hand Galaxy 300s around the middle of 1965 and sold them for £150. I cannot remember ever seeing one advertised in the Hamads section of AR so there is no basis for a second hand value. However, because of their limited coverage, they would probably bring somewhat less than the other tri-banders. The units sold by Sideband Electronics were all converted to cover Australian band segments and I would think others would have been similarly converted. Matching Galaxy power supplies are unknown in this country, so of course you could expect to find a home built supply with them.

I do have circuits of these rigs available for any one interested at 40c including postage. A full review of the Galaxy 300 was published in the December 1963 issue of CQ magazine. It was superseded by the well known Galaxy III and V models. ■

Newcomers Notebook

with Rodney Champness VK3UG
44 Rathmullen Rd., Boronia, Vic., 3155

MORSE CODE

From time to time much griping is heard about the morse code examinations. You hear one person say that it was too fast, another that it was too slow, another that the characters are sent too fast with too much gap, another that there is no spacing, another that the dots are too short and yet another that the dots and dashes are the same length. You would think that they were all sitting for separate exams under different examiners whereas they all sat for the one exam which was sent by one examiner.

The morse cannot be all these things at once!! It seems to me that perhaps various methods of mis-instruction of morse students are used. I would imagine that the examining authorities would have some standard which they send for examinations. I would rather think that morse could only be sent fairly if sent to the standard as set by the International Telecommunications Union. Check your morse study against the ITU standards before the August exam.

Now over to David Down with some information on aerials.

PRACTICAL ANTENNA BASICS

This article represents the first "follow-up" to the earlier article in this column "LOW POWER DX". As mentioned therein, plenty of time and work should be spent on the antenna system. The dipole or vertical are excellent types of antennas with which to commence. They are simple to construct and erect, cheap to build, and so are ideal *"firsts"* for the newcomer to amateur radio.

Many and varied are the references on the subject of antennas and, suffice to say here, a simple method of calculating the length of a practical half wave antenna is 468/F(MHz) feet. At resonance the induced voltage will be maximum at the ends of the antenna (high impedance) while the current will be maximum at the centre.

FEEDERS

Since the antenna should be located in the clear and generally as high as possible to produce maximum signal strength, it is necessary to use a feeder to connect the antenna to the receiver. Low impedance feeders may be flat twin (nominal 70-80 ohms), coaxial cable (nominal 50-80 ohms) or flat TV ribbon (nominal 240-300 ohms). High impedance feeders consist of two parallel wires spaced apart by insulators every 8-12 in. or so.

HALF WAVE DIPOLE

Lengths of a half wave antenna in the various HF and broadcast bands are as follows:

BROADCAST		AMATEUR	
Band	Length	Band	Length
11m	18'2"	160m	256'
13m	21'7"	80m	128'
16m	26'	40m	66'
19m	30'	20m	33'
25m	39'4"	15m	22'
31m	48'	10m	16'
41m	65'		
49m	76'		

As the impedance at the centre of a half wave antenna is approximately 70 ohms, either flat twin or coaxial cable will provide a good impedance match to the antenna ensuring maximum signal transfer. The antenna length calculated from the formula given above, is cut at the centre and an insulator inserted, the wires of the feeder being connected to either side of the insulator. When connecting the feeder to the antenna at the insulator, it is good practice to loop the feeder *over* the insulator in an inverted "U" style to prevent rain and dirt from settling in the feeder. Coaxial feeder ends can be sealed for the same reason by means of plastic tape or mastic waterproof compounds.

FOLDED DIPOLE

If you prefer, you may feed a dipole with 300 ohm TV ribbon, but to ensure the best feeder-antenna match it is necessary to form the antenna as shown in Fig 1. This configuration will transform the input impedance by a factor of 2^2 or 4 x 70 = 280 ohms.

If a three-fold dipole is used, the input impedance will be 70 x 3^2 = 630 ohms,

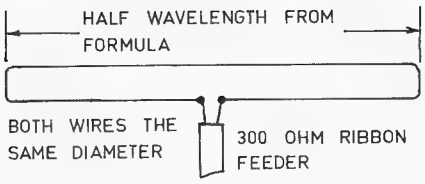


FIG 1

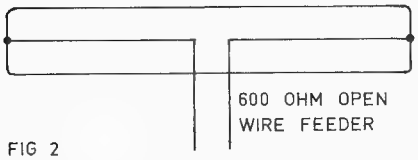


FIG 2

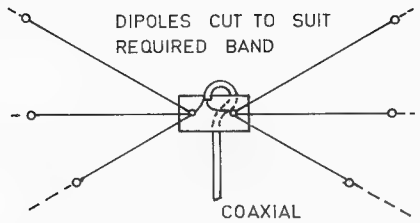
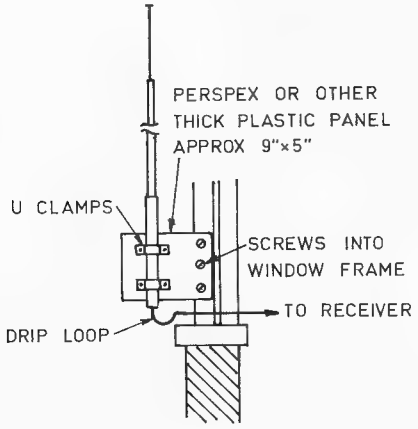


FIG 3



which will provide a good match to an open line feeder as shown in Fig 2.

When constructing a folded dipole using 300 ohm feeder and antenna ribbon, one conductor only of the antenna is cut at the centre, and the feeder inserted and the joints soldered. The junction is then clamped between pieces of insulating material and properly waterproofed. When the 300 ohm ribbon is cut for the half wave antenna length, bare back about ½ in. of the plastic insulation on each of the four conductors, then short each end to complete the folded dipole loop.

MULTIBAND DIPOLE

If dipoles are required for optimum performance on several frequency bands they can be connected in parallel at their centres and fed with a common feeder, thus providing multiband facilities in a minimum of space. The ends of the dipoles may be tied off to any convenient supports and the dipoles need not all be in the same plane. Note that a dipole cut for, say, the 40m amateur band, will be three half waves on the 15m amateur band, thus eliminating the need for a separate antenna for that band. See Fig 3.

VERTICAL ANTENNAS

Also known as "whips" and these come in a variety of forms, many being ex-Government and very cheap. They can be telescopic, lengths of rod which screw into each other, or several tubular sections with a single wire running through them which holds the sections rigid when tightened. In certain locations a whip antenna is about the only practical type, since it can simply be mounted outside a window, as shown in Fig 4. The whip should be as long as possible, but very tall ones present mounting problems due to wind pressure. Generally a whip antenna will be non-resonant on the HF bands and should, ideally, be connected to an Antenna Tuning Unit. If not, it may be connected to the aerial terminal directly or via a variable capacitor.

DIRECTIVITY

Signal pick-up of a half wave antenna is maximum at right angles to the line of the wire and this factor should be taken into account when deciding where to site the antenna. Antennas longer than this tend to have their directivity reduced but improve all-round coverage.

In the next article in this series, the construction and use of an Antenna Tuning Unit suitable for use with the various types of wire antennas will be discussed. ■

Trade Review

Spectrum International market a range of equipment for the amateur radio market. Readers of AR will be aware of some of the HF crystal filters offered by this company. We have been fortunate in obtaining a filter from their range for evaluation.

The filter supplied was the XF-9E, a 9 MHz, 12 kHz wide, filter designed for FM receiving applications. This filter would suit owners of transceivers with a 9 MHz filter who would like to receive FM, or reasonable quality AM.

A passive matching circuit was connected to the filter prior to test. This provided a 50 ohm load/source for the test equipment and a 1200 ohm, 30 pf load/source for the filter. This network unfortunately had a 34 dB loss, which when combined with the filter's ultimate rejection of more than 90 dB, meant that the test equipment should have a dynamic range of 124 dB.

In fact, the test equipment available worked satisfactorily over 115 dB only, and so the ultimate rejection could not be measured. Considerable care was taken to shield the input from the output. The filter was tested in a diecast box and additional shielding was fitted around the input and output circuitry. To obtain the specified performance from the filter in normal use, one would need to exercise similar care. The filter will not give 90 dB attenuation if stray leakage is only 60 dB down! It is also most important to ensure that the filter bottom plate is solidly grounded.

The input and output transformers are built into the filter and the only adjustment required involves adjusting the 30 pf input and output trimmers so as to obtain minimum bandpass ripple.

The bandpass characteristics were obtained using a signal generator, a vector voltmeter and a preamplifier. A later test using a spectrum analyser system confirmed the test results, which are shown in the table.

The performance of the filter is excellen as can be seen from the figures. When mounted on a PCB it is ¾" high and requires an area 1-3/64th in. by 1-27/64th in. This represents quite a lot of performance in a small volume. The bandpass ripple figures of SI filters are always impressive and this unit was no exception.

The unit was delivered within a few days of the request reaching the USA. SI claim this incredibly quick service is quite normal. Allowing for mail delays in VK you should be able to get delivery of goods from SI in less than 10 days.

The filter was well packed in expanded foam and obviously was not affected by its journey.

In summary, an excellent filter at a reasonable price.

S.I. XF-9E FM 9 MHz FILTER

Parameter	Specified	Measured
—6 dB Bandwidth	12 kHz	12.3 kHz
Pass Band Ripple	less than 2 dB	1.2 dB
Insertion loss	less than 3dB	2.6 dB approx.
Shape Factor	(6:60 dB) 1.8	(6:60 dB) 1.6
	(6:80 dB) 2.3	(6:80 dB) 2.2

VK3AFW ■

Book Review

"SPECIALISED COMMUNICATIONS TECHNIQUES FOR THE RADIO AMATEUR"

Published by the ARRL. 208 pages.

As the title implies this recent ARRL book deals with some of the more esoteric amateur radio practices. The subjects covered in chapter form include amateur television, both fast and slow scan, space communication via satellites and moonbounce, radioteletype and facsimile. A further chapter is devoted to lasers, and various pulse and digital communication modes.

In general, the book follows the usual ARRL format of background material supplemented by construction articles reprinted from QST. The amount and quality of the reference material varies from chapter to chapter but is generally of a high standard. In particular the RTTY and space communication sections are very well covered. The material on the reception of weather satellite pictures in the facsimile chapter, whilst somewhat dated in choice of circuits, is also good. Thirteen pages of concise background data on moonbounce is provided and the Oscar satellite coverage is excellent.

My sole criticism of this book would be of the editor's choice of some of the circuits. I would doubt, for example, whether an amateur with the technical ability to build a Vidicon camera would choose, in 1975, a valve circuit. Notwithstanding, the book would be excellent value, in my opinion, if bought for the reference value alone. I would recommend it to anyone interested in one or more of the subjects covered.

VK3ZDH ■

VHF UHF
an expanding world

with Eric Jamieson VK5LP

Forreston, S.A., 5233
Times, GMT

AMATEUR BAND BEACONS

VK0	VK0MA, Mawson	53.100
	VK0GR, Casey	53.200
VK1	VK1RTA, Canberra	144.475
VK2	VK2WI, Sydney	52.450
	VK2WI, Sydney	144.010
VK3	VK3RTG, Vermont	144.700
VK4	VK4RTL, Townsville	52.600
	VK4WI/1, Mt. Mowbullan	144.400
VK5	VK5VF, Mt. Lofty	53.000
	VK5VF, Mt. Lofty	144.800
VK6	VK6RTV, Perth	52.300
	VK6RTU, Kalgoorlie	52.350
	VK6RTW, Albany	52.950
	VK6RTW, Albany	144.500
	VK6RTV, Perth	145.000
VK7	VK7RTX, Devonport	144.900
P29	P29GA, Lae, Niugini	52.150
3D	3DAA, Suva, Fiji	52.500

Last month, and again this month, the ZL 2 metre beacons have been omitted from the listings. At this time of the year the likelihood of them being heard in VK is rather remote; they will return to the list when the warmer weather arrives. Long distance 6 metre beacons are still included as these can pop up any time especially as nowadays there does seem to be an increase in distance contacts in the middle of winter. Still no news of the Darwin beacon, someone may advise the situation soon.

Activity in general has been very slack this month, about the only worthwhile activity being an opening to VK2 from VK5 at 0800 to 1000Z on 29.5.75.

Don VK3AKN writes that Steve VK3ZAZ on 5.5.75 heard 3D2AZ at 0945Z and worked the same station at 1050Z via Oscar 6 or 7. Steve again worked 3D2AZ on 13.5 at 0949Z, sent 5 x 7, received 5 x 5. He has now worked 5 countries including two DU stations in the Philippines, DU1 JMG and DU1POL. Also included are P29GA and VK0GM. Steve has now received his QSL for the QSO with VK2BKE on Lord Howe Island on 6 metres, and on 2 metres is hoping for a VK8 to show up to complete Worked-All-States on 144 MHz. A lot of others are waiting too, and if present indications of activity in Alice Springs, the logical place from which to originate such a signal, are any guide, you may all be waiting for quite a while yet!

FM ACTIVITY

Well, it happened. In the May issue I stuck my neck out with a comment on the use of repeaters higher than Channel 4, asking for confirmations etc. I got one. A letter came from Don VK3AKN, and I do not think Don would mind it being printed. It reads: "I am sorry you don't approve of repeaters outside Channels 1 to 4. We, in the Western Zone WIA Vic. Division are planning to put Mt. William repeater on Ch. 7.

"We are quite clear about our aim in establishing this repeater and we have found we can not achieve this fully on any of the four common channels nor indeed on channels 5 or 6. Please give us the credit for knowing what we are doing since we feel that our repeater sub-committee are as well qualified as any others in capital cities or elsewhere.

"While we are always happy to welcome visitors and travellers, this repeater was not primarily established for them. It is very active with local traffic, and consequently DX signals cause quite a lot of interference when openings come about. I am afraid though, if you wish to speak with us, you will have to speak our language. 73. Don."

I suppose the only comment I can make is that one is never too old to learn! It just comes rather as a surprise to me to find that DX on VHF, and at 146 MHz at that, worries people to the extent that frequency changes for the troops are necessary. Nevertheless, I do acknowledge that if the Western VK3 boys do need something akin to a private channel then that is their right and privilege, I wish them well.

George VK3ASV, the Publicity Officer for the Victorian State Repeater Committee, has sent along his latest list of Australian repeaters. It is a formidable list totalling 39 stations, including those presently operating and those projected. According to this list, those operating, or projected, outside Channels 1 to 4 are Tamworth VK2RAB on Ch. 6; Gosford VK2RAG on 5; Blue Mountains area on 7; Wollongong VK2AMW on 6; Wagga on 5; Ballarat VK3RBA on 5; Mt. Macedon VK3RMM 6 or 7; Mt. William VK3RWZ on 7; on a very close study of George's latest listing, which is more comprehensive than earlier, I would have to acknowledge that the two heavier populated States, VK2 and 3, have a case for extending beyond Channels 1 to 4 especially when considering a mutual interference situation due to repeaters on similar frequencies being within operating range. The DX boys will just have to reduce power.

ARE YOU HOME?

Quote from QST March 1975 ". . . a ham in Akrom (rather carelessly) announced his location at one of the large mall parking lots and that he would be back on the repeater after some shopping. Some thieves did some shopping in his absence, taking all ham equipment and the stereo tape deck. A word to the wise . . ." There's a moral in stories like that; repeaters can be useful, in more ways than you might think.

News is pretty scarce this month, so the notes end here.

Thought for the month: "Crowding a life does not always enrich it".

The Voice in the Hills. ■

WORKED ALL INDIAN OCEAN AWARD

Instituted by CHC Chapter 66, Australia

1. OBJECT OF THE AWARD

The object of the Award is to foster an interest by Australian and Overseas radio amateurs in making two-way radio contacts with fellow amateurs in countries bordering on, and islands within, the Indian Ocean.

2. INDIAN OCEAN BOUNDARIES

For the purpose of this award the following specifies the accepted boundaries of the Indian Ocean:

(a) From Cape Leeuwin (Western Australia) to the intersection of latitude 48°-20' Sth and Longitude 60°E, thence along Latitude 48°-20' Sth in a westerly direction to its intersection with Longitude 20°E.
(b) Northwards Longitude 20°E to Cape Agulhas (South Africa), along the East Coast of Africa to the Gulf of Aden, and across the Gulf of Aden via Perim Island to Aden.
(c) Along the coast of South Yemen, Muscat and Oman to Trucial Oman to the Gulf of Oman and across the Straight of Ormuz from Kalhat to Bander-Abbas (Iran).
(d) Along the coast of Iran, the entire coast of India, West and East Pakistan and Burma, the West coast of Thailand and Malaya, down to, and including, the island of Singapore.
(e) A line joining Singapore to the North-eastern tip of Timor. This line passes through the Southern coast of Borneo and cuts through Celebes at, approximately, Macassar.
(f) From the North-eastern tip of Portuguese Timor to the point where the Eastern boundary line of Western Australia (Longitude 129° East) meets the coast between Cambridge Gulf and the mouth of the Victoria River.
(g) Thence along the coast of Western Australia to the starting point at Cape Leeuwin.

3. QSO REQUIREMENTS

Applicants will be required to establish two-way radio contact, by any mode and/or band/s, with one station in ten (10) of the twelve (12) countries, or groups of countries, plus one contact in five (5) of the islands listed in paragraph 4 below, a total of fifteen (15) contacts.

4. COUNTRY, OR GROUP OF COUNTRIES

(a) Western Australia — VK6.
(b) Indonesia — including Borneo and Celebes (Sarawak and Sabah are excluded).
(c) Singapore.
(d) Malayan Peninsula — 9M2.
(e) Burma or Thailand.
(f) India.
(g) East Pakistan or Ceylon.
(h) West Pakistan or Iran.
(i) Muscat and Oman, Trucial Oman, or South Yemen.
(j) French Somaliland, Somali Republic, Kenya, or Tanzania.
(k) Mozambique or Malagasy Republic.
(l) South Africa ZS 1, 2, 4, 5 and 6.

Note: Lesothe — 7P8, and Swaziland — ZD5, both being "land-locked" are **not** acceptable for purposes of this award.

The following are the acceptable islands: Christmas Island VK9, Andaman Islands VU5, Laccadive Islands VU4 or VU5, DX-pedition, Socotra Island VS9, Seychelles VQ9, Algelega Island 3B6, Comoro Island FB8, Rodriguez Island 3B9, Reunion Island FR7, Juan de Nova FR7, Timor CR8 YB 8F, New Amsterdam Island FB8, Cocos Islands VK9, Nicobar Islands VU5, Maldive Island 8QA, Chagos Archipelago VQ9, Gloriosa Island FR7, St. Brandon Island 3B7, Mauritius 3B8, Zanzibar VQ1, Prince Edward and Marion Islands ZS2, Crozet Islands FB8, St. Pauls Island FB8, Tromelin Island FB8.

Any other islands within the Indian Ocean boundaries specified in para 2 above, and officially accepted by the Wireless Institute of Australia and the ARRL.

Note particularly that Heard Island and the Kerguelen Islands are in the Southern Ocean **not** the Indian Ocean.

6. APPLICATIONS FOR THE AWARD

(a) The award is available to any radio amateur who submits proof of having made two-way contact with the required number of countries and islands as laid down in paragraph 3, and within the Indian Ocean boundaries as specified in paragraph 2.
(b) All contacts **must** be confirmed by QSL. Open to all SWL.
(c) QSL cards need not be forwarded with applications for the award, but may be sent should the applicant so desire.
(d) If QSL cards are sent with application it is recommended that they be sent by registered post, with sufficient remittance for return by the same means.
(e) Applications which are not accompanied by QSL cards must contain an endorsement from either one CHC Member, or two licensed amateurs, certifying that the required QSL cards have been sighted.
(f) An operator engaged on a DX-pedition may claim the country or island concerned towards the award.
(g) Contacts made since the end of World War II are eligible.
(h) In general all CHC Rules are applicable.
(i) Applications for the WIO Award, accompanied by QSL cards, or certification/s, plus fees prescribed in paragraph 6 below, should be forwarded to:
VK3APU, J. C. Gutcher,
17 Foulds Court,
Montrose, Victoria, Australia 3765.

6. FEES

(a) By Surface Mail — 50c or 4 IRCs.
(b) By Air Mail — $1.00.

Letters to the Editor

Any opinion expressed under this heading is the individual opinion of the writer and does not necessarily coincide with that of the Publishers.

The Editor,
Dear Sir,

The following is a list of radio amateur stations whose moon echoes were heard by WA6LET at the SRI 150' dish during the February 22-23, 1975 moonbounce tests. Two-way CW communications was completed with all except those marked with)(, who were only heard, or had incomplete exchange of information. Those stations marked with

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BASIC ELECTRONICS — An Electronics Aust. Publ.	**3.00**

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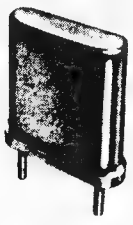

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Sydney: PARIS RADIO ELECTRONICS, 7a Burton Street, Darlinghurst, N.S.W. 2010, Phone: 31-3273.
Perth: W. J. MONCRIEFF PTY. LTD., 176 Wiftenoon Street, East Perth,, 6000, Phone: 25-5722.
Brisbane: FRED HOE & SONS PTY. LTD., 246 Evans Road, Salisbury North, 4107, Phone: 47-4311
Adelaide: RQGERS ELECTRONICS, P.O. Box 3, Modbury North, S. A. 5092. Phone: 264-3296.

& had multiple contacts, and those marked with $ had two-way SSB contacts.

144 MHz (11 hours)

K1HTV—Conn		W7FN—Wash	
K1WHS—Maine	$&	K7HTZ/7—Wash	&
W1YTN—Maine		WA7KYZ—Wash	$&
W2AZL—NJ	)(	W7RUC—Ariz	)(
WA2BIT—NY	$&	K8III—Ohio	$
WB2CIK—NY		K9UYK—III	
K2RTH—NY	$&	K9UIF—Ind	
K3NYD—?	)(	K0WLU—SDak	&
K3PGP—Pa	&	VE2DFO—Que	$&
WA3QVN—Md	&	VE3ONT—Ont	
W3TMZ—Md		DK1KO	
K4GL—SC		DL3YBA	
W5ORH—Okla		DL0WW	)(
WA5UNL—Okla		F6CER	
K5VWW—Tex		F8SQ	
WA6UAM—Cal	$	F9FT	
K6DYD—Cal		F9QW	
K6QEH—Cal		PA0JMV	
W6RDF—Cal		SM7BAE	
WA7BBM—Ariz		ZE1DX	

432 MHz (2 hours)

W1SL—Conn		K8UQA—Ohio	
W1JAA—Mass		W9WCD—III	
K9AQP/1—Mass		K0TLM—Mo	)(
K2UYH—NY	$&	PA0SSB	
W2SZ/2—NY	)(	ON5FF	)(
W3CCX—Pa		SM5LE	)(
W4ZX1—Fla		ZE5JJ	

53 EME QSOs were made with 36 different stations in 14 states and 6 foreign countries on 144 MHz, bringing our total to 25 states and 8 countries (including USA). Eleven EME QSOs were made with 10 different stations in 7 states and 2 foreign countries on 432 MHz. Three variable power transmitting tests were conducted. Equipmental difficulties allowed only two hours of transmitting time on 432 MHz. It is hoped that these will be corrected, a standby transmitter will be obtained, and the 432 MHz EME tests can be repeated by next fall.

Victor R. Frank

The Editor,
Amateur Radio
Dear Sir,

For two years I studied a WIA Radio Course and finally took the plunge sitting for the examination on 18 February 1975.

I have, 13 weeks later, still not given up hope that one day the PMG will mark it. A friend of mine in Australia has not received his either, so I doubt that it is because I am residing in PNG.

Perhaps there is a very good reason for the delay, although one escapes me. If it took approx 7 weeks to obtain results for a one page Morse Exam then, in proportion, I guess that I have a long wait for a 13 page Theory Paper.

Yours faithfully,
J. T. Connel, P.O. Box 718, Madang.

40 Hardwicke St., Balwyn, 3103

The Editor,
Amateur Radio
Dear Sir,

The morse sessions transmitted nightly through VK2BWI have for many years provided excellent practice and their usefulness will be even more widespread with the introduction of the novice licence.

It appears that some amateurs are not aware of this service, as severe QRM is becoming increasingly frequent from both CW and SSB operators in the Melbourne area.

I am sure that many intending examinees would appreciate 3550 kHz being kept clear for approximately one hour from 0930 GMT.

Yours sincerely,
Richard Goslin, L30598

20 Years Ago

with Ron Fisher VK3OM

JULY 1955

The Australian Amateur Radio call book celebrates its first birthday. The Editorial page of July Amateur Radio of 1955 looked at its success and future possibilities. The call book was published each year in those days. The 1955 edition ran to 140 pages with only about 35 call signs to a page. Rather spread out in comparison to our current editions.

The VHF page reported a couple of firsts. VK2WH at Forbes worked into Melbourne on 144 MHz, while VK3ATN at Birchip made the first VK3 to Adelaide contact on the same band. The gear at VK2WH was typical of the day and consisted of 6AK5 6J6 6AK5 converter in a cascode set up to a BC348 receiver as a tuneable IF. Transmitter ran 95 watts input to a 6/40 and a 32 element phased array antenna. SCR522 transmitters were also a popular means of RF generation around that time.

The DX activity page included a name for the first time that was to become famous over the next few years. Danny Weil of "Yasme" fame. Yasme was of course his first Yacht and used to transport Danny and his many famous call signs on a world wide DXpedition.

Results of the Ross Hull VHF contest for 1954/55 announced the trophy winner as R. Greenwood VK4NG. Top scores in other states were VK2ABC, VK3ZL, VK5MK and VK7ZL with no entries from VK6.

Technical articles in the July 1955 issue of Amateur Radio included: Part two of Wideband Audio Phase Shift Networks by N. Southwell VK2ZF. Modification of MN26 Receivers by Syd Clark VK3ASC. Syd showed how the MN26 could be adapted to a car radio or a high performance broadcast receiver for home use.

An Antenna for the SWL. Norman Burton claimed his simple wire antenna gave 4 to 6 "S" points gain over a long wire.

An Accurate Electronic Timer. VK3 associate member R. Barnett described a timer suitable for photographic work. ■

Magazine Index

With Syd Clark, VK3ASC

Every now and again we have a light load of magazines for review; probably due to uncertainties of mail arrivals etc. This is such a month, so I have been able to include mention of the British magazine catering to Amateur TV enthusiasts.

CQ-TV Febfuary 1975 No. 89

A Novel Use for a Varicap Tuner; More Facts on Fax; An Image Orticon Camera; Circuit Notebook No. 20 and news of ATV doings.

BREAK-IN March 1975

Crystal Control Operation with the FT101; Another Linear Amplifier; Otago Branch Contest — Receiver Section.

QST March 1975

Using the Double Balanced Mixer in VHF Converters; QRP Shakedown Caymanian Style; A State of the Art QRP Transceiver for 50 MHz; SSTV to Fast Scan Converter Pt. 1; An Up Converter for Oscar Reception; Emergency Electrical Energy via ManPower.

RADIO COMMUNICATION February 1975

VHF Meteor Scatter Propagation; An 80m DC Receiver for the Novice; Control of Aerial Polarisation; Speech Clipper for the Microwave Modules A3 Transmitter; Building Blocks for the Novice; A Strange Case of Mains Interference; Modifications to a Stolle Memomatic Rotator.

73 MAGAZINE January 1975

Using the W.U. Desk Fax; How to find the Satellite; RTTY Secrets; The 432 Receiver; The AN/GRR-5 Receiver; TTL as a Decoder Mode; Simplifying Satellite DXing; Blow a Bundle on TTLs; The R-511, A Real Surplus Bargain; How not to be a Loser; The Versatile Transistor Checker; SSTV Video Analysis; An All-Band Receiver to Build; Keep Amateur Radio a Secret. ■

Intruder Watch

with Alf Chandler VK3LC

1536 High Street, Glen Iris, 3146

JULY, 1975

As I shall be overseas for some months this will be my last report until my return, and Intruder observations should be forwarded to Ivor, VK3XB until further notice.

A precis of the latest summary may be of interest to Members —

21030	A3	Radio Peking announced.
21249	A1	9VYR calling JOU.
14015.5	A1	WLG calling PEPE.
14016	A1	HBKL calling MVCP.
14021 to 14041		QEBL calling CBFN. This station has been calling and passing traffic every day now at various times and frequencies.
14080	A1	LPU calling AOX with propaganda re Vietnam.
14084	A1	HZV Broadcast of news re Vietnam.
14143.5	A1	MH22 calling CQ.
14150	A3J	Fishing boats off Queensland coast, presumably Taiwanese. (Strong recommendation for complaint put in to PMG.)
14298	F1	HMA22 RTTY with read-out submitted.
14300	F1	HMA9 ditto.
7000	A2	Jammer with CQ superimposed.
7002	A3	Broadcast in Cantonese.
7015	A3	Penang Radio, Malaysian language.
7120	F1	"QRA de HMK22/HMF12 freq 10580/7120 kc KCNA Pyong Yang" (Our old friend moved from 7015).
3504	A1	JF32 calling S8LQ.
3519	F1	RDW2 calling RIX52.
3522	A1	DQB11 "TBO de DQB11".

These are only a few of the reported stations for which I am always grateful, but keep them coming.

Several broadcast stations in the 3.5 MHz band have also been reported, and forwarded to our Authorities. ■

Awards Column

with BRIAN AUSTIN VK5CA
P O Box 7A, Crafers, SA, 5152

WORKED ALL BRITAIN SERIES

1. The awards are available to licensed amateurs and shortwave listeners (on a "heard" basis).
2. Contacts on and after 1st January 1946 are valid.
3. QSL cards must be in the possession of applicants if the claimed contacts were before 1st January 1971 otherwise log entries are sufficient.
4. Do not send QSL cards. A special book, containing application forms (see below) is available from the Awards Manager. The special application form is mandatory. The cost of the book is 65p or $2.
5. The award is issued to the operator and not to the callsign. Where an operator has been operating a club station the contact is to the credit of both the operator and the club.
6. The fee for the award is $1.50, 40p or 10 IRCs. International Money Orders may be used for payment but not cheques on non-UK banks. Cheques should be made out to "The WAB Award Account". Seals are available for a large addressed envelope and 1 IRC.
7. The address for application is

Roy Kirk, G3ULH,
11 Essex Ave
Kingswinford
Brierley Hill
Staffs. U.K.

The United Kingdom is divided into 10 km squares (National Grid) and each square has a reference of two letters and two figures (SP99 TX34 etc.) The book, see above, contains all the grid references with the names of the towns etc. within the square, arranged by counties. It also contains a list of islands etc. around the coast of the United Kingdom — an essential part of the award.

All contacts on and after 1.1.1946 count. However from 1.1.1975 only contacts on and after 1.1.1970 will be valid.

The book also contains details of other WAB awards. All profits from the sale of the book are donated to the RAIBC and donations above the cost of the book are always appreciated.

Requirements:

Basic Award — 300 areas with at least 30 counties and one each of GC, GI, GM and GW.
Bronze Award — 500 areas with at least 45 counties and any 3 UK islands.
Silver Award — 750 areas with at least 65 counties with any 4 UK islands.

Gold Award — 1,000 areas with at least 80 counties and any 5 UK islands.

Diamond Award — Details of this award are in the WAB book and is not confined to working WAB areas.

WORKED ZAMBIA AWARD

1. The award is available to licensed amateurs and shortwave listeners (on a "heard" basis).
2. Contacts with 9J2 and other prefixes in Zambia are valid.
3. Do not send QSL cards. A list, giving full details of the contacts should be certified by the Awards Manager of a National Society.
4. Separate classes of the award are available — all CW, all AM, 2 x SSB and mixed modes.
5. The fee for the award is $1 or 7 IRCs.
6. The address for application is:

   Awards Manager, RSZ,
   Post Box 332,
   Kitwe
   Zambia.

Rules:

Each 9J2 station counts as one point on 7, 14, 21 & 28 MHz. Each 9J2 station counts as two points on 1.8 and 3.5 MHz. Other prefixes count double points. The same station may be worked on different bands.

Requirements:

Stations in CQ Zones 36, 37 and 38 — 20 points; all other stations — 10 points. ■

Key Section

with Deane Blackman VK3TX

Box 382, Clayton, Vic., 3168

The President's Cup for 1974 has been won by VK3ANU. By the time you read these notes I hope it will have been engraved and be gracing Drew's mantlepiece.

The Cup is an actual cup, first awarded to the Key Section by the Federal President in 1931 and revived in 1973. It is now awarded to the Australian amateur who scores the greatest aggregate in the four VK contests for any year. The scores published in Amateur Radio are weighted because it is easier to score in some contests than others. The weighting factors are 100 for the Ross Hull, 80 for the National Field Day, 40 for the Remembrance Day, and 1 for the VK/ZL. These factors were based on actual results in these contests from 1965 to 1972. You do not have to be a member of the Key Section, nor apply in order to win — just be in the contests.

As it is quite some time since any details of the Section appeared in this column perhaps I might, quietly, explain things again. The Section was set up by the Institute in 1972 to promote CW and the interests of CW operators. Membership is not restricted to WIA members. As Federal Manager I have a sort of secretarial function, and control at divisional level is through divisional co-ordinators. The present divisional co-ordinators are VK1DC, VK2YB, VK3XB, VK4RF, VK6WT and VK7RH. There is presently no VK5 co-ordinator. If you have any questions about, or ideas for, the Section please write to me.

Congratulations to VK2SG, who topped the VK scores in the CW section of the VK/ZL contest, and to VK2YB, who won the 6-hour section of the NFD. As I will have no entry in August AR, let me anticipate by wishing you now an enjoyable contest. ■

Try This

with Ron Cook VK3AFW
and Bill Rice VK3ABP

CONVERT YOUR FT200 TO 11 METRES (26.96 MHz - 27.23 MHz)

If you have looked at your station licence you will realise 11 metres is available to amateurs, that is full, and (in due course) novice, licencees.

Because most rigs do not include coverage of this band, usage is minimal. Or is it? Those able to listen on 11 will know of the many Pirates who are having a ball up there. On our band!

If you have an FT200 and half an hour to spare, you can increase the versatility of your rig by adding 11 metre coverage.

Open the cabinet and with the front panel facing you, you will notice on the right front side a row of crystal positions. As supplied, only one of these positions will be occupied unless you have requested, or have added yourself, extra coverage of 10 metres.

The conversion to 11 metres is very simple.

Step 1 Locate the 42.5 MHz crystal position and solder in a 41.5 MHz crystal.*

Step 2 Move your band change switch to the 28 MHz position and set the black tuning dial to 500. This will co-incide with 27.5 MHz. Activate the internal calibrator and adjust the dial until a beat note is heard. (A stronger signal will result if the antenna is removed).

Step 3 Set the grid control to the fifth stop position and then up-end the set so that you are able to observe the S meter whilst adjusting the slugs in the relevant coils. Peak L3, L8, and L13 in that sequence for the greatest meter reading.

You should now be on 11 metres. If your receiver is a bit deaf, you might consider replacing the first RF tube with a 6EW6.

*41.5 MHz crystal, HC18U holder. Fundamental operation. Parallel mode, 20 pF load. Tolerance .005%.

Steve Bushell VK3BHK ■

Contests

with Jim Payne, VK3AZT
Federal Contest Manager,
Box 67, East Melbourne, Vic., 3002

CONTEST CALENDAR

July	5-6	Venezuelan Phone
	5-6	DL QRP CW
	12-13	ARRL "Open" CD CW
	19-20	ARRL "Open" CD Phone
	19-20	Colombian CW & Phone
Aug	9-10	European CW
	16-17	Remembrance Day
	23-24	All Asian CW

REMEMBRANCE DAY CONTEST

Variations in the rules have been designed to allow more contacts to be made, particularly during the usually quieter periods. There are lots of alternatives, and more suggestions to help the FCM come up with the ultimate in rules and scoring will be very welcome. In the US a new Area Code Contest will be held on Independence Day and Thanksgiving Weekend. The first of these is on 5/6 July. Telephone area code numbers, of which there are more than 120 in US and Canada, are included in the RST report. Each QSO is to count as 2 points and the multiplier is the number of different area codes worked.

A Space net VHF contest on July 19/20 requires the zipcode (postcode) to follow the RST report and for scoring, the last 2 digits of every zipcode are added. Sum of these digits is your final score, no multiplier.

As it appears likely that the number of amateur stations in Australia may almost double as a result of Novice licensing there should be much more intra-call area activity on the novice bands for the 1976 RD. Just in case some scoring scheme incorporating the postcodes does materialise, some contestants may wish to keep their new call books up to date as this shows postcodes for each QTH.

VENEZUELAN CONTEST

Starts 0000, Sat July 5th for 24 hours. No indication on detail sheet whether this is local or GMT. Phone only on 10 through 80. Exchange RS and 3 figures starting 001. Scoring is 1 point per QSO (world wide) and 2 points each YV. Contacts in same country no value. Multiplier is 1 for each country, YV and US call areas worked on each band. Final score is total QSO points times the sum of multiplier on each band. In addition to awards, certificates are issued to VK stations who work 5 YVs and stations in 5 other countries and who send $1 or equivalent IRCs for return of what Frank W1WY describes as "one of the most attractive certificates I have seen". Entries to be postmarked not later than Sept 15 to Radio Club Venezolano, PO Box 2285, Caracas 101, Venezuela.

DL QRP CW CONTEST

1800 GMT July 5th to 1500 GMT July 6th. Limited to 10 watts input and CW only. Limit operation to 15 hours. Contacts 1.8-28 MHz. Scoring is complex.

COLOMBIAN CONTEST

0001 GMT 19th July to 2359 20th July.

Exchanges on world wide basis on all bands 3.5 through 28 MHz. Exchange RST and 3 figure QSO number. Scoring is 5 points for QSOs with HKs, 3 points North America, other countries 2 points, in same country 1 point. Multiplier is number of DX countries worked each band. Final score is sum of QSO points from all bands multiplied by sum of different countries worked on each band. Award winners must have at least 50 QSOs on log. Use separate log sheet each band. Include summary sheet and declaration with logs. These must reach L.C.R.A., Concurso Independencia, Apartado, Postal 584, Bogota, Colombia by 30th Sept, 1975. A plaque is awarded for the best log from Oceania.

EUROPEAN CW

0000 GMT Aug 9th to 2359 Aug 10th.

(David VK3QV sent details of this contest from SP5 land. Also received was a handbook containing results of the 1974 contest, log sheets, summary sheet and a multiplier check list for the 1975 contest. The administrative work involved in these International contests must be a mammoth task.)

All bands 3.5 through 28 MHz. Only 36 of the 48 hours of the contest may be used. Up to 3 periods of rest totalling 12 hours are permitted. Contacts from VKs are limited to European stations. Each QSO is 1 point. A station may be worked once per band. Each confirmed QTC, given or received, 1 point. Multiplier for VKs is number of European countries worked on each band. In addition multiplier on 3.5 is multiplied by 4, on 7 MHz by 3 and on 14/21/28 MHz by 2. Final score is total QSO points plus QTC points multiplied by the sum total multipliers from all bands. QTC traffic. Additional point credit can be realised by making use of the QTC traffic feature. A QTC is a report of a confirmed QSO that has taken place earlier in the contest and later sent back to a European station. It can only be sent from a non-European station to a European station. The general idea being that after a number of European stations have been worked, a list of these stations can be reported back during a QSO with another station. A QTC contains the time, date and QSO number of the station being reported, i.e. 1300/DA1AA/134. This means that at 1300 GMT you worked DA1AA and received number 134. A QSO can be reported once only and not back to the originating station. ONLY A MAXIMUM OF 10 QTCs TO A STATION IS PERMITTED. You may work the same station several times to achieve this quota. Only the original contact however has QSO point value. Keep a uniform list of QTCs sent. QTC 3/7 indicates that this is the 3rd series of QTCs sent and that 7 QSOs are reported.

Use a separate log for each band. These must reach the WAEDC Committee, D-895 Kaufbeuren, Postbox 262 Germany, by 15th Sept 1975.

European Country List: C31 — CT1 — CT2 — DL — DM — EA — EA6 — EI — F — FC — G — GC Guer — GC Jer — GD — GI — GM — GM Shetland — GW — HA — HB9 — HB0 — HV — I — IS — IT — JW Bear — JW — JX — LA — LX — LZ — M1 — OE — OH — OH0 — OK — ON — OY — OZ — PA — SM — SP — SV — SV Crete — SV Rhodes — SV Athos — TA1 — TF — UA1346 — UA2 — UB5 — UC2 — UN1 — UO5 — UP2 — UQ2 — UR2 — UA Franz Josef Land — YO — YU — ZA — ZB2 — 3A — 4U1 — 9H1.

EUROPEAN PHONE

13/14 Sept 1975. Same rules etc as for CW contest above. ■

1975 REMEMBRANCE DAY CONTEST RULES AUG. 16th & 17th

A perpetual trophy is awarded annually for competition between Divisions of the Wireless Institute of Australia. It is inscribed with the names of those who made the supreme sacrifice and so perpetuates their memory throughout Amateur Radio in Australia.

The name of the winning Division each year is also inscribed on the trophy and, in addition, the winning Division will receive a suitably inscribed certificate.

OBJECTS

Amateurs in each VK call area, will endeavour to contact other amateurs:—

(i) In other VK call areas, P29 and ZL on all bands 1.8 through 30 MHz.

(ii) In any VK call area (including their own), P29 and ZL on authorised bands above 52 MHz and is indicated in rule No. 5.

CONTEST DATE

0800 hours GMT on Saturday 16th August 1975 to 0759 hours GMT on Sunday 17th August 1975.

All amateur stations are requested to observe 15 minutes silence before the commencement of the contest on Saturday afternoon. An appropriate broadcast will be relayed from all Divisional stations during this period.

RULES

1. There shall be 4 sections to the Contest.
   (a) Transmitting Phone
   (b) Transmitting, CW
   (c) Transmitting, Open and
   (d) Receiving, Open.
2. All Australian amateurs (VK callsigns) may enter the contest whether their stations are fixed, Portable or mobile. Members and non-members of the Wireless Institute of Australia are eligible for awards.
3. Amateurs may use these modes:
   (a) Phone
   (b) CW
   (c) RTTY
   (d) SSTV.
   However, only one entry may be submitted for sections (a) to (c) in Rule 1. An open log is one where points are claimed for more than one mode. AM, SSB and FM are grouped as one mode, i.e. Phone.
4. Cross mode operation is permitted but both stations may only claim points as for a phone/phone contact. Cross band operation is not permitted, excepting via a satellite repeater.
5. **SCORING**
   (a) On the 3.5, 7, and 14 MHz bands a station in another call area may be contacted once on each band using each mode. That is, you may work the same station on each of these bands on phone, CW, SSTV or RTTY.
   (b) On the 1.8, 21, 26 and 28 MHz bands a station in another call area may be contac'ed twice on each band using each mode provided that not less than 12 hours has elapsed since the previous contact on that band using that mode.
   (c) Between 1600 hours GMT and 2100 hours GMT on Saturday intra-call area contacts may be made on 1.8, 7, 21, 26 and 28 MHz, once for each mode on each band.
   (d) Between 0300 hours GMT and 0759 hours GMT on Sunday intra-call area contacts may be made on 1.8, 21, 26 and 28 MHz bands, once for each mode on each band.
   (e) On the bands 52 MHz and above, the same station in any call area may be worked using any of the modes listed in Rule 3 at interva's of not less than 2 hours since the previous same band/mode contact. However, the same station may be con'acted repeatedly via satellite not more than once by each mode on each orbit.
   (f) All CW/CW, SSTV and RTTY contacts count double. Note rule 4 re cross mode contacts.
6. Multi licensed operator stations are not permitted. Although log keepers are permitted, only the licensed operator is allowed to make a contact under his own call sign. Should two or more licensed operators wish to operate any particular station, each will be considered as a contestant and must submit a log under his own call sign. Such contestants shall be referred to as substitute operators for the purpose of these rules and their operating procedures shall be as shown.
   PHONE. Substitute operators will call "CQ RD" or "CQ Remembrance Day" followed by the call of the station they are operating, then the word "log" followed by their own call sign, e.g. "CQ RD from VK4BBB log VK4BAA".
   CW. Substitute operators will call "CQ RD de" followed by the group call sign comprising the call sign of the station they are operating, an oblique stroke and their own call e.g. "CQ RD de VK4BBB/VK4BAA".
   Contestants receiving signals from a substitute operator will qualify for points by recording the call sign of the substitute operator only.
7. Club stations may be operated by other than licensed members and contacts credited to the Club station call sign. Rule 6 applies to the licensed operator in attendance. All operators must sign the declaration.
8. Entrants must operate within the terms of their licence.
9. **CYPHERS.** Before points may be claimed for a contact, serial numbers must be exchanged and acknowledged. The serial number of 5 or 6 figures will be made up of the RS (telephony) or RST (CW) reports plus 3 figures that will be incremented by one for each successive contact. If any contestant reaches 999 he will start again with 001.
10. **ENTRIES.** Must be set out as shown in the example, using one side of the paper only and standard WIA log sheets if possible. Entries must be clearly marked "Remembrance Day Contest" on the envelope and must reach the Federal Contest Manager, WIA, Box 67, East Melbourne, 3002 in time for opening on Wednesday 17th September, 1975. Early submission of logs will be appreciated.
11. **TERRESTRIAL REPEATERS.** Contacts via terrestrial repeaters are not permitted for scoring purposes. However, contacts may be arranged through the repeater and if successful on another 2 metre channel, that contact counts for scoring purposes.
12. Portable operation. Log scores of operators located outside their own call area will be credited to that call area in which operation takes place, e.g. VK5XYZ/2. His score is added to the VK2 scores.
13. ALL LOGS shall be set out as in the example shown and in addition MUST carry a front sheet showing the following information:
    Name
    Address
    Section
    Call sign
    Claimed score
    Number of contacts
    Modes used
    Declaration: "I hereby certify that I have operated in accordance with the rules and spirit of the contest".
    Signed
    Date
    All contacts made during the contest must be shown in the log submitted. If an invalid contact is made it must be shown but no score claimed. Entrants in the "Open" section must show the various mode contacts in numerical, i.e. chronological order.
14. The Federal Contest Manager has the right to disqualify any entrant who during the contest, has not observed the regulations or has consistently departed from the accepted code of operating ethics. The Federal Contest Manager also has the right to disallow any illegible, incomplete or incorrectly set out logs.
15. The ruling of the Federal Contest Manager of the WIA is final and no disputes will be entered into.

AWARDS

Certificates will be awarded to the top scoring stations in Sections (a) to (c) of Rule 1, in each call area, and will include top scorer in each Section of each call area operating exclusively on 52 MHz and above. Each VK, ZL and P29 call area will count as separate areas for awards. There

SCORING TABLE FOR PHONE CONTACTS — ALL CW/CW, SSTV and RTTY CONTACTS COUNT DOUBLE

From	To 0	1	2	3	4	5	6	7	8	9	P29	ZL
VK0	—	6	6	6	6	6	6	6	6	6	6	2
VK1	6	—	1	1	2	3	5	4	6	5	5	2
VK2	6	3	—	1	2	3	5	4	6	5	5	2
VK3	6	4	1	—	2	1	4	3	6	5	5	2
VK4	6	3	1	2	—	3	6	5	4	3	3	3
VK5	6	5	2	1	3	—	4	3	3	6	6	4
VK6	6	6	2	1	4	2	—	3	5	6	6	4
VK7	6	5	1	1	3	2	5	—	5	6	6	2
VK8	6	5	1	1	2	3	6	4	—	3	3	4
VK9	6	5	3	3	3	4	5	6	3	—	6	5
P29	6	5	3	3	4	4	5	5	5	6	—	5
ZL	6	5	3	3	4	4	5	5	5	6	5	—

Read table from left to right for points for the various call areas.

ALL INTRA-CALL AREA CONTACTS ON 52 MHz AND ABOVE, OR AS INDICATED IN RULES 5(c), (d), and (e) are worth one point.

EXAMPLE OF TRANSMITTING LOG

Date Time/GMT	Band	Mode	Callsign Worked	RST sent	RST rec'd	Points

EXAMPLE OF RECEIVING LOG, VICTORIAN SWL

Date/time GMT 16 Aug. 75	Band	Mode	Call sign heard	RST sent	Station called	Points
0612	7	P	VK5PS	58002	VK6RU	1
0615	7	CW	ZL2AZ	559004	VK3KI	4
0618	14	P	VK0ZZ	57006	VK6FI	6
0624	14	P	VK6FI	58004	VK0CB	4
1620	28	P	VK3WI	59077	VK3ZZ	1
17/0750	1.8	CW	VK3YQ	599360	VK3OR	2
0754	52	P	VK3XYZ	58444	VK3XYY	1

NOTE—Times for intra-call area loggings shown in Rule 5.

will not be an outright winner. Further certificates may be issued at the discretion of the Federal Contest Manager. The Division to which the Remembrance Day Trophy will be awarded shall be determined in the following way —

Average of top 6 logs plus (number logs entered divided by number of call area licences, multiplied by total points from all entrants from call area in Sections a, b and c).

VK0 scores are added to VK7 and VK8 to VK5. Scores by VK9 stations are added to the mainland call area geographically nearest. Scores claimed by ZL and P29 stations are not included in the score of any VK call area.

Acceptable logs for all sections shall show at least five valid contacts. The trophy shall be forwarded to the winning Division in its container and will be held by that Division for the specified period.

RECEIVING SECTION (Section d)

1. This section is open to all short wave listeners in Australia, Papua-New Guinea and New Zealand but no active transmitting station may enter.
2. Contest times and loggings of stations on each band are as for transmitting.
3. All logs shall be set out as in the example. It is not permissible to log a station calling "CQ". The detail shown in the example must be recorded.
4. Note the times and conditions set out in Rule 5.
5. Club stations may enter this section. All operators must sign the declaration.

AWARDS

Certificates will be awarded to the highest scorers in each call area. Further certificates may be awarded at the discretion of the Federal Contests Manager. ■

PROJECT AUSTRALIS

With DAVID HULL VK3ZDH

Reference Orbits for Oscar 6 and Oscar 7. Schedule for Oscar 6. Satellite is "on": Sunday morning, Monday night, Thursday night, Saturday night, local times. Oscar 7 is always "on".

OSCAR 6

Date	Orbit No.	Equator crossing Time Z	Long °W
JULY			
1	12376	00.02	51
2	12389	00.57	65
3	12402	01.52	79
4	12414	00.52	64
5	12427	01.47	77
6	12439	00.47	62
7	12452	01.42	76
8	12464	00.42	61
9	12477	01.37	75
10	12489	00.37	60
11	12502	01.32	74
12	12514	00.32	59
13	12527	01.27	72
14	12539	00.27	57
15	12552	01.22	71
16	12564	00.22	56
17	12577	01.17	70
18	12589	00.17	55
19	12602	01.11	68
20	12614	00.11	53
21	12627	01.06	67
22	12639	00.06	52
23	12652	01.01	66
24	12664	00.01	51
25	12677	00.56	65
26	12690	01.51	78
27	12702	00.51	63
28	12715	01.46	77
29	12727	00.46	62
30	12740	01.41	76
31	12752	00.41	61
AUGUST			
1	12765	01.36	75
2	12777	00.36	59
3	12790	01.30	73
4	12802	00.30	58
5	12815	01.25	72
6	12827	00.25	57
7	12840	01.20	71
8	12852	00.20	56
9	12865	01.15	70
10	12877	00.15	54
11	12890	01.10	68
12	12902	00.10	53
13	12915	01.05	67
14	12927	00.05	52
15	12940	00.59	66
16	12953	01.55	79
17	12965	00.54	64
18	12978	01.49	78
19	12990	00.49	63
20	13003	01.44	77
21	13015	00.44	62
22	13028	01.39	75
23	13040	00.39	60
24	13053	01.34	74
25	13065	00.34	59
26	13078	01.29	73
27	13090	00.29	58
28	13103	01.23	72
29	13115	00.23	57
30	13128	01.19	70
31	13140	00.19	55

OSCAR 7

Date	Orbit No.	Mode	Equator crossing Time Z	Long °W
JULY				
1	2848	B	00.24	56
2	2861	A	01.18	70
3	2873	B	00.18	54
4	2886	A	01.12	68
5	2898	B	00.12	53
6	2911	A	01.06	66
7	2923	B	00.05	51
8	2936	A	00.59	65
9	2949	B	01.54	78
10	2961	A	00.53	63
11	2974	B	01.47	77
12	2986	A	00.47	61
13	2999	B	01.41	75
14	3011	A	00.40	60
15	3024	B	01.35	74
16	3036	A	00.34	58
17	3049	B	01.28	72
18	3061	A	00.28	57
19	3074	B	01.22	70
20	3086	A	00.21	55
21	3099	B	01.15	69
22	3111	A	00.15	54
23	3124	B	01.09	67
24	3136	A	00.09	52
25	3149	B	01.03	65
26	3161	A	00.02	50
27	3174	B	00.56	64
28	3187	A	01.51	78
29	3199	B	00.50	62
30	3212	A	01.44	76
31	3224	B	00.44	61
AUGUST				
1	3237	A	01.38	74
2	3249	B	00.37	59
3	3262	A	01.32	73
4	3274	B	00.31	58
5	3287	A	01.25	71
6	3299	B	00.25	56
7	3312	A	01.18	69
8	3824	B	00.18	54
9	3337	A	01.12	68
10	3349	B	00.12	53
11	3362	A	01.06	66
12	3374	B	00.05	51
13	3387	A	00.59	65
14	3400	B	01.54	78
15	3412	A	00.53	63
16	3425	B	01.48	77
17	3437	A	00.47	62
18	3450	B	01.41	75
19	3462	A	00.41	60
20	3475	B	01.35	74
21	3487	A	00.34	58
22	3500	B	01.28	72
23	3512	A	00.28	57
24	3525	B	01.22	70
25	3537	A	00.21	55
26	3550	B	01.16	69
27	3562	A	00.15	53
28	3575	B	01.09	67
29	3587	A	00.09	52
30	3600	B	01.03	65
31	3612	A	00.02	50

■

Hamads

- Eight lines free to all WIA members. $3 per 3 cms for other amateurs and SWLs.
- Copy should be in block letters or typescript. signed and forwarded to the The Editor, PO Box 150, Toorak, Vic. 3142.
- Excludes commercial advertising.
- Closing date for Hamads is the 3rd day of the month preceding publication.
- QTHR means the advertiser's name and address are correct in the current Australian Callbook.

FOR SALE

Slow Scan Valve Monitor (shown in EA July '73), plus SSTV solid state sig. gen. and 931A scanner attachment, $100. FT2FB transceiver complete with 8 latest channels, $180. Gil Miles, VK2KI, QTHR. Ph. (02) 78 4237.

American Raytheon compact 60 watt marine radiotelephones (four), 8 channels 1.65 MHz-5 MHz, separate 110V AC PSU. Inbuilt broadcast receiver, squelch, mic., cables, 14 valves and diodes incl. 12BY7 osc., 6883 PA, 12AB5 driver, 12DQ6 mod. Ideal for conversion, $85.00 each. Ian Marshall VK2JI, QTHR. Ph. (02) 90 4035.

Multi-7 Crystals, 10 channels 40 to 60, AC power supply, HyGain magnetic whip, new Feb. '75, $225. VK1BH, 99 Warragamba Ave., Duffy, ACT. Ph. (062) 88 6062.

SI Filter XF-9E (see advert. AR, Feb. '75, page 23), new but tested and evaluated, $35.75 post paid. First cheque secures. Box 150, Toorak, Vic. 3142.

Yaesu FT2FB Auto Transcanner 2m, mobile cradle, built-in 12/240V supply, brand new condition, in original pack, 2N5590 15W final, spares. Asahi 5/8 loaded whip, gutter mount, 12 ft. coax. 8 scanned channels and priority, A, B, C, R1, R4, was $400 — asking $240 the lot. VK2ZDR, QTHR. Ph. (049) 33 6501 (day).

Colour TV RCA 21 inch with inbuilt Pal (D) decoder and separate 240V AC to 110V AC step-down XFMR, $350. VK2BRA, QTHR. Ph. (02) 47 0146 A.H.

TH3JR Beam, unused, brand new in carton, $120 ONO.

Hustler 4BTV trap vertical 80 to 10 metres, as new condition, $65 ONO.

FT101B, as new, complete with matching speaker unit, mic., handbook, etc., $525 ONO.

Collins 3.1 kHz mechanical filter, with data book, $20 ONO.

VK3ARZ, 12 Explorers Court, Vermont South, 3133. Ph. (03) 232 9492.

FL50 SSB Tx with FV50 VFO, $150. SR550 Ham Band Rx, $70. STC CTR50-132 Base Station with remote 727 type control unit, $90. PO Box 909, Orange, NSW. Ph. (063) 62 4388, ext. 218 bus; (063) 62 6072 A.H.

HW 32a Heath 20 metre transceiver, 200 PEP, excellent rig, suitable for transverting, $140 ONO. **HW17a Heath** 2 metre transceiver, AM & FM, needs xtals for nets and repeaters, a very fine rig (Rx tunes 143-148 MHz), $160 ONO. G. Scott VK3ZR. Ph. (03) 89 4645.

Silent Keys

OWEN BESTED **VK2AEB**

It is with deep regret that we record the passing of Owen Bested VK2AEB. Owen obtained his AOCP at the age of 54, and operated from Griffith where he was a successful wine maker. Retiring in 1969, he moved to Port Macquarie, and was active mostly on twenty metres. Secretary/Treasurer of The Oxley Region Radio Club, his happy nature was always apparent amongst fellow amateurs. He passed away quietly after a short illness on the 24th April at Port Macquarie. Our sympathy to his wife and family, and his brother Phil VK5CS.

N. E. MORTLOCK **VK2PQ**

New 6HF5s, $4.00 ea., **Walky-Talky** 27.125 MHz, one pair for $21.00, postage incl., VK2BMI, QTHR. Ph. (02) 771 1657.

Geloso 222 Tx 70W AM CW 80-10m. Good cond. Geloso 209 Rx SSB AM CW 80-10m. Fair cond. Will sell separately. What offers? VK2ADZ, 28 Probert Ave., Griffith, 2680. Ph. (069) 62 3718.

Eddystone 730/4 communications Rx, 500 kHz-30 MHz, 16 valves, good condition with instruction manual, $200. A. R. Dexter VK5DL, 37 Adelaide Tce., St. Marys, Adelaide 5042. Ph. (08) 79 7901 bus. only.

Yaesu FT101, little used, unmarked, as brand new, all accessories used only as a Rx by present owner, 160-10 Mx, $420 ONO. 30 ft. galvanised self-supporting Southern Cross Tower, $75. No. 62 Set Mk II 1.6-10 Mcs, original condition, $35. No. 62 Mk II transceiver, suitable for parts, $15. G. McNamara, 14 Hyland St., Warrnambool. Ph. (055) 62 8238 bus. only.

Home Brew Linear, pair 813s GG, with power supply, $100. XFB9 9Mc xtal filter with upper and lower sideband xtals, $25. VK3BW, QTHR. Ph. (052) 59 2322.

Swan 350 SSB Transceiver, includes matching AC supply, mic., spare PA tubes, $290. DC supply for above, $45. VK5ZG, 4 Glencoe Rd., Reynella, SA, 5161.

AR7 Receiver, modified to DCA circuit, complete with power supply and all coil boxes, $34 ONO. QQE06/40 power amp with tuned lines for 144 MHz. Suit linear or PA use, $30 ONO. G. Scott VK3ZR. Ph. (03) 89 4645.

Solid State Tracking Rx, 19" rack mount, xtl synthesized local oscillator, digital frequency display. 10, 30, 100, 300 kHz xtl filters, PLL BW 10, 30, 100, 300 Hz. Used for direct reception of 130-140 MHz and as tuneable IF for 400 and 1700 MHz. With two 136 MHz preamps, $330. VK1VP, QTHR. Ph. (062) 48 5882.

WANTED

Modulator Type 17SU-14A Unit for STC AMT125 transmitter and any spare parts available for same unit. Contact I. Keenan VK3AYK, QTHR. Ph. (03) 92 5667.

Maintenance Handbook for frequency meter type AN-URM-32A, reasonable payment. Please write — VK5TI, PO Box 307, Clare, SA, 5453.

52 MHz transverter, suitable FT-101. VK5ZJP, 20 Alexandra Ave., Rose Park, 5067. Ph. (08) 31 1638.

Afterthoughts

NOVICE LICENSING

AR May 1975, page 22, contained a transcription error. The 21 MHz band portion permitted for Novices will be 21.125 to 21.200 NOT 21.125 to 21.500 as printed. This accords with the PMG's letter printed in May 1973 AR, page 7 (see also July 1973 AR, p.15 for other information). Sorry, but it was really a rush job to get it into May AR. ■

SIDEBAND ELECTRONICS SALES and ENGINEERING

TRIO-KENWOOD

Model TS-900 de-luxe transceivers, with PS-900 AC supply-speaker unit	**$800**
Model TS-520 AC-DC transceivers with external speaker	**$550**
External VFO for the TS-520	**$80**
CW filter for the TS-520-900	**$40**
TV-502 2M. transvertor for the TS-520, just plug it in and switch over to 2M. SSB operation	**$200**
Model QR-666 all-band coverage receiver	**$300**

YAESU MUSEN

Model FT-101-B AC-DC transceivers	**$575**
Model FT-200 AC transceivers with AC FP-200 supply	**$400**
Digital Frequency counters model YC-335-D 0-200 MHz	**$250**
SPECTRONICS DD-1 digital counter for the FT-101-B	**$150**

All TRIO-KENWOOD & YAESU MUSEN transceivers come complete with original English manual, all crystals for all available bands, a P.T.T. dynamic microphone and a bonus free S.W.R. Meter.

HY-GAIN ANTENNAS

14 AVQ 10-40 M. vertical 19' tall, no guys	**$65**
18 AVT-WB 10-80 M. vertical, 23' tall, no guys	**$90**
TH 3 JR 10-15-20 M. junior el. Yagi 12' boom	**$135**
TH 3 Mk3 10-15-20 M. senior 3 el. Yagi 14' boom	**$180**
TH6DXX 10-15-20 M. senior 6 el. Yagi 24' boom	**$225**
204-BA 20 M. monoband 4 el. full size Yagi 26" boom	**$190**
HY-QUAD 10-15-20 M. full size Cubical Quad	**$200**
Magnetic base mobile whip 108 MHz and higher with 18' RG-58U cable and coax plug	**$18**
BN-86 baluns	**$18**

CDR ROTATORS

AR-22-R for 2 & 6 M. and small h.f. beams	**$50**
AR-20-R for 2 & 6 M. beams	**$40**
HAM-II with re-designed control box	**$150**

All three models for 230 V AC complete with indicator-control units.

4-conductor light cable for AR-20-22	**20 cents per yard**
12-conductor light cable for HAM-II	**30 cents per yard**
8-conductor heavy duty cable for HAM-II	**60 cents per yard**

BARLOW WADLEY RECEIVERS

Model XCR-30 Mk II 500 KHz to 31 MKz continuous coverage communications receivers, crystal controlled reception of AM-USB-LSB-CW **$250**

POWER OUTPUT METERS

Galaxy RF 550A with 6 position coax switch **$75**

SWR METERS

Midland twin-meter type for 52 Ohms, up to 1 KW on hf **$22**

BALUNS

Japanese baluns, 1 KW PEP 75 Ohms impedance only **$10**

MOBILE ANTENNAS

MARK helicals 6 feet long	HW-80 for 80 M.	**$18**
	HW-40 for 40 M.	**$18**
	HW-20 for 20 M.	**$16**
	high power KW-40 for 40 M.	**$25**
	tri-band HW-3 for 10-15-20 M.	**$25**
Swivel mobile mount & chrome plated spring for MARKs		**$12**
ASAHI model AS-303A set of 5 whips 10 to 80 M. Complete with ball mount and spring		**$90**
AS-2-DW-E 1-4 wave 2 M. mobile whip		**$8**
AS-WW 5/8 wave 2 M. mobile whip		**$15**
AS-GM gutter clip mount with cable & connectors		**$10**
M-RING body mount and cap for 2 M. whips		**$5**

COAX CONNECTORS

Amphenol VHF types Standard PL-259, Angle male-female, T-connector, RCA male to Amphenol female adaptor. All models **$1 each**

CUSH CRAFT ANTENNAS

DGPA 52 to 27 MHz adjustable ground-plane	**$25**
LAC-2 lightning arrestors	**$6**

CRYSTAL FILTERS

9 MHz similar to the FT-200 ones, with 2 carrier crystals **$35**

POWER SUPPLIES

240 V, AC to 12V DC 3 to 3.5 Amps, regulated **$35**

SPECIAL

KEN KP-12A speech processors, 230V AC, contain a complete SSB generator, 10-7 MHz filter, clipper, etc. **$100**

27 MHz EQUIPMENT

MIDLAND 5 W AM 23 channels transceivers, with PTT mike 12 V DC **$95**
MIDLAND 5 W AM 15 W PEP SSB 23 channels transceivers PTT mike 12 V **$175**
SIDEBAND Brand One Watt model NC-310 hand-held transceivers **$50**
SIDEBAND Brand 5 W AM 15 W PEP SSB 23 channels transceivers, with noise limiter-blanker, PTT mike, 12 V DC **$190**

144 MHz TWO METER EQUIPMENT

MULTI-7 10 W output FM transceivers, 24 channels with crystals for 10 channels 40 to 60, includes all Australian repeaters and anti-repeater operation, with PTT mike and mobile mounting bracket, 12 V DC operation, still only **$225**

KEN PRODUCTS KP-202 2 W output FM hand-held transceivers with the hottest receiver available anywhere, 6 channels now with crystals for channels 40 and 50 and all 4 repeaters **$150**; KCP-2 battery chargers and 10 NICAD batteries **$35**; Leather carrying case for the KP-202 **$6**; Stubby flexible helical whip antennas for the KP-202 **$6**.

KLM ELECTRONICS solid state 12 V DC 2 M. amplifier, 12 W output, automatic antenna change-over when driven, ideal for mobile use with the KEN KP-202 **$50**.

All prices quoted above are net SPRINGWOOD, N.S.W., cash with orders, sales tax included in all cases, subject to changes without prior notice. No terms nor credit nor COD available, only cash and carry, no exceptions. All-risk insurance available for 50 cents per $100 value, minimum insurance $0.50. Allow for freight, postage or carriage, excess will be promptly refunded ... MARY & ARIE BLES, Proprietors.

SIDEBAND ELECTRONICS SALES and ENGINEERING

P.O. BOX 23, SPRINGWOOD, N.S.W. Postcode 2777

TELEPHONE, **DURING BUSINESS HOURS ONLY!** STD 047 511-394

JULY 1975
VOL. 43, No. 7

hy-gain MULTI-BAND VERTICALS

NEW

Hy-Gain's Incomparable

HY-TOWER

for 80 thru 10 Meters

Model 18 HT

- **Outstanding Omni-Directional Performance**
- **Automatic Band Switching**
- **Installs on 4 sq. ft. of real estate**
- **Completely Self-Supporting**

By any standard of measurement, the Hy-Tower is unquestionably the finest multi-band vertical antenna system on the market today. Virtually indestructible, the Model 18HT features automatic band selection on 80 thru 10 meters through the use of a unique stub decoupling system which effectively isolates various sections of the antenna so that an electrical ¼ wavelength (or odd multiple of a ¼ wavelength) exists on all bands. Fed with 52 ohm coax, it takes maximum legal power...delivers outstanding performance on all bands. With the addition of a base loading coil, it also delivers outstanding performance on 160 meters. Structurally, the Model 18HT is built to last a lifetime. Rugged hot-dipped galvanized 24 ft. tower requires no guyed supports. Top mast, which extends to a height of 50 ft., is 6061ST6 tapered aluminum. All hardware is iridite treated to MIL specs. If you're looking for the epitome in vertical antenna systems, you'll want Hy-Tower. Shpg. Wt., 96.7 lbs.

Order No. 182 — **$245.00**

Also available . . .
14AVQ/WB 40-10m - **$67.50**
12AVQ 20, 15 & 10m - **$48.00**
All prices include sales tax, freight extra. Prices and specifications subject to change. All in stock at time of preparation of advertisement.

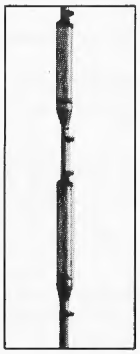
NOW...A GREAT NEW WIDE BAND VERTICAL

for 80 through 10 Meters

Hy-Gain's 18AVT/WB

Take the wide band, omni-directional performance of Hy-Gain's famous 14AVQ/WB, add 80 meter capability plus extra-heavy duty construction – and you have the unrivalled new 18AVT/WB. In other words, you have quite an antenna.

- Automatic switching, five band capability is accomplished through the use of three beefed-up Hy-Q traps (featuring large diameter coils that develop an exceptionally favorable L/C ratio).
- Top loading coil.
- Across-the-band performance with just one furnished setting for each band (10 through 40).
- True 1/4 wave resonance on all bands.
- SWR of 2:1 or less at band edges.
- Radiation pattern has an outstandingly low angle whether roof top or ground mounted.



CONSTRUCTION . . . of extra-heavy duty tapered swaged seamless aluminum tubing with full circumference, corrosion resistant compression clamps at slotted tubing joints...is so rugged and rigid that, although the antenna is 25′ in height, it can be mounted without guy wires, using a 12″ double grip mast bracket, with recessed coax connecter.

Order No. 386 — **$90.00**

The Versatile Model 18V for 80 thru 10 Meters

The Model 18V is a low-cost, highly efficient vertical antenna that can be tuned to any band...80 thru 10 meters...by a simple adjustment of the feed point on the matching base inductor. Fed with 52 ohm coax, this 18 ft. radiator is amazingly efficient for DX or local contact. Constructed of heavy gauge aluminum tubing, theModel 18V may be installed on a short 1⅝ inch mast driven into the ground. It is also adaptable to roof or tower mounting. Highly portable, the Model 18V can be quickly knocked down to an overall length of 5 ft. and easily re-assembled for field days and camping trips. Shpg. Wt., 5 lbs.

Order No. 193 — **$33.50**

bail
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60 Shannon St., Box Hill North, Vic., 3129.
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QLD. MITCHELL RADIO CO., 59 Albion Road, Albion, 4010 Ph 57 6830
N.S.W. STEPHEN KUHL, P.O. Box 56, Mascot, 2020 Ph Day 667 1650 A.H. 371 5445
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